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Telephony

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Guaranteed Circulation This Issue
11,964, of Which 11,413 Is Paid

ANOTHER TELEPHONE SCHOOL

Clemson College conducts engineer-school for Southern Bell T&T. Here Gurney Poole (left) and J. M. Street of Bell talk beneath statue of Thomas Clemson, college founder. See page 20 for article on Clemson-Bell course.

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

57

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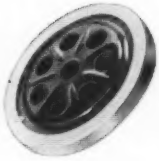
MADE IN A

Is this news to you?

The  transmitter, receiver

and coil-capacitor assembly

of the Stromberg-Carlson telephone

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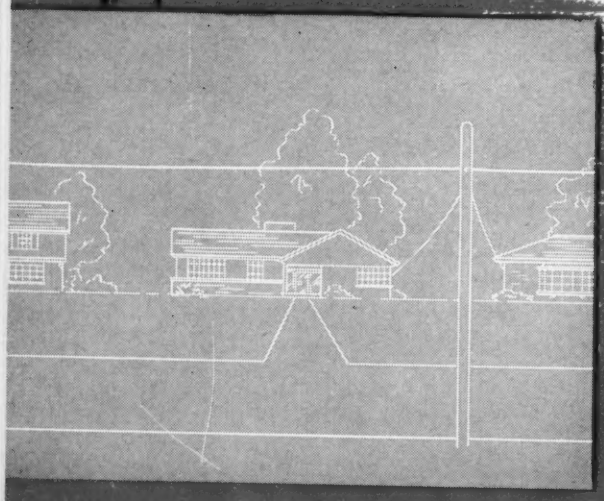

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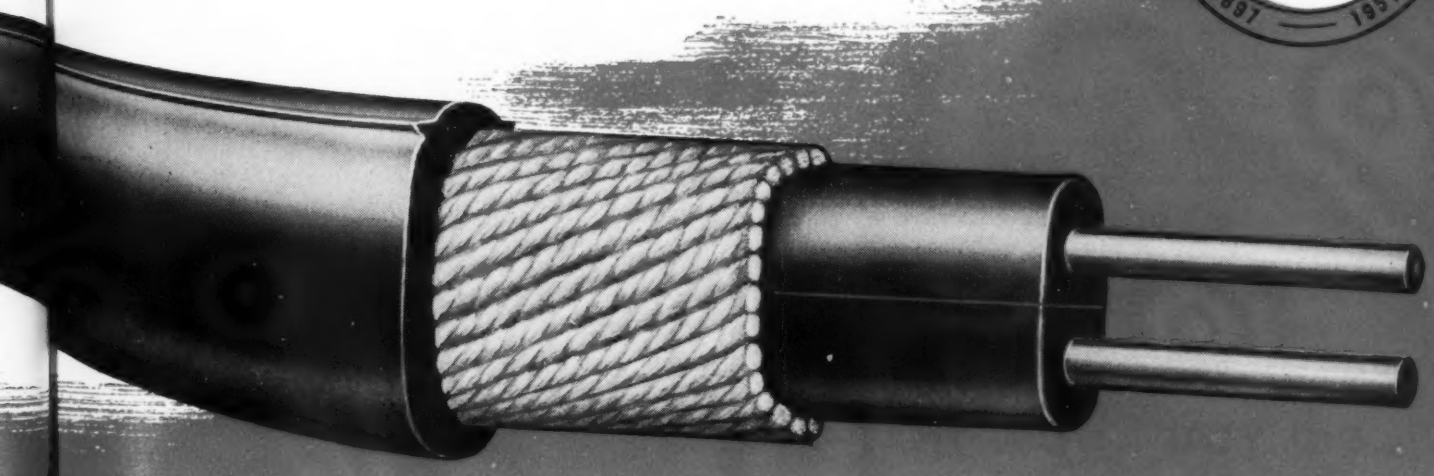

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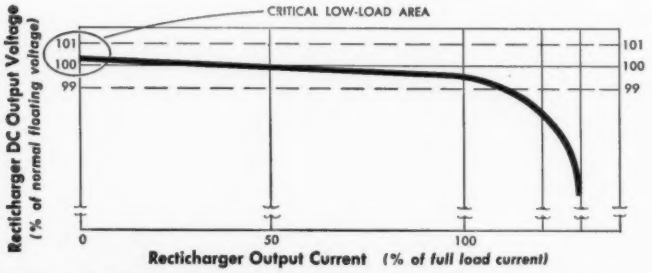

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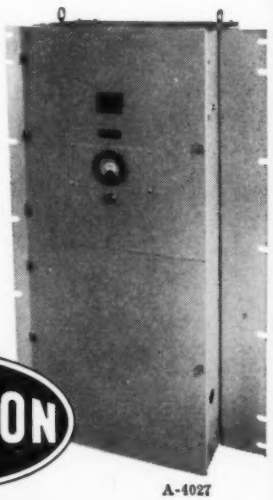

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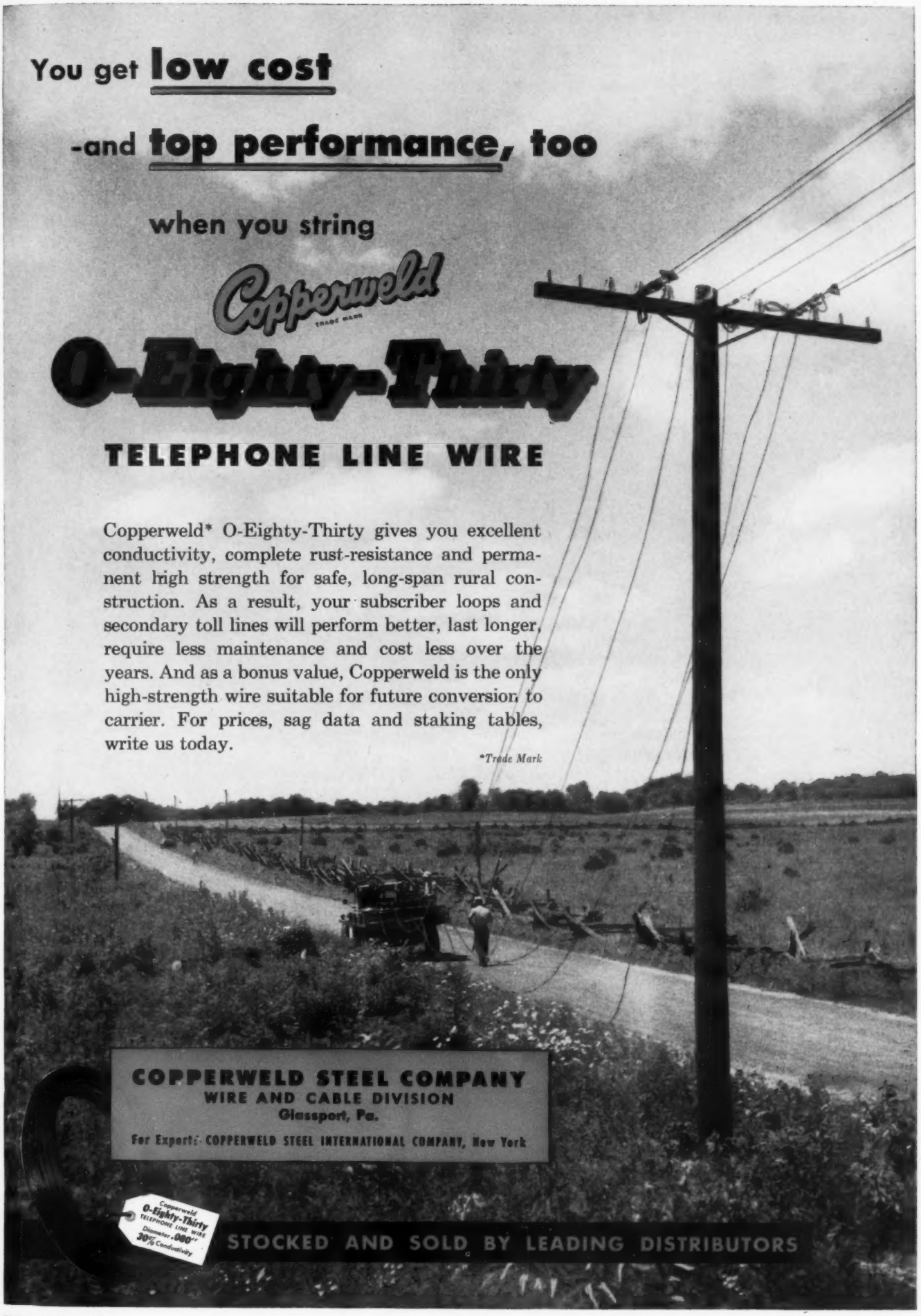

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FLASHES AND PLUGS

CONSPIRACY BY TELEPHONE. A community wishing to honor one of its local physicians was "hard put" recently to get him to cooperate. It finally took an emergency telephone call to put it over.

When his family casually suggested to the St. Charles, Mo., physician, aged 75, that he attend a testimonial dinner at the local high school, the doctor turned it down, saying, "They'll just have some greasy food that will upset my ulcer, and besides, it'll probably be for some joker I don't like."

Daunted by the flat refusal, the family temporarily withdrew for further counsel on the side. Came the night of the dinner, and a telephone call from a patient saying her husband was ill at the same dinner. The good doctor rose to the occasion, as he had for almost 50 years as a family physician. In fact, he hurried to the scene, this time with the police chief acting as chauffeur.

Nobody was ill and a good time was had by all. The dinner was a surprise affair in honor of the doctor, who had been named "Man of the Year" by the local chamber of commerce, which, thanks to the telephone conspiracy, finally had the pleasure of toasting its honor guest on his birthday.

•

IT HAPPENED IN PARIS. The Associated Press tells of the grocer in Paris, Ky., who cheerfully consented to a woman's request to use his telephone—then had to stand by in astonishment as she put in a long order with another grocery, thanked him and walked out.

•

SILENT SPLENDOR. A current newspaper dispatch pictures Ben Hecht, busy on a screen play now being completed in Italy, as living elegantly in a beautiful villa on the outskirts of Rome that is the type of place everyone dreams of with one exception.

When people want to reach him, they have to call a country restaurant near the house and a waiter goes to fetch him from his medieval solitude.

•

ON YOUR MARKS! AT&T's *Long Lines* suggests that nowadays the old nursery rhyme should go like this: "One for the money, two for the show, three to get ready and four to go, and $5.00 for the baby sitter."

•

LEGAL LOOPHOLE. A little tot in church for the first time watched the ushers pass the collection plates.

When they neared his pew, the boy piped up so everyone could hear, "Don't pay for me, Daddy, I'm under five."

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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

June 15, 1957

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ACME VISIBLE

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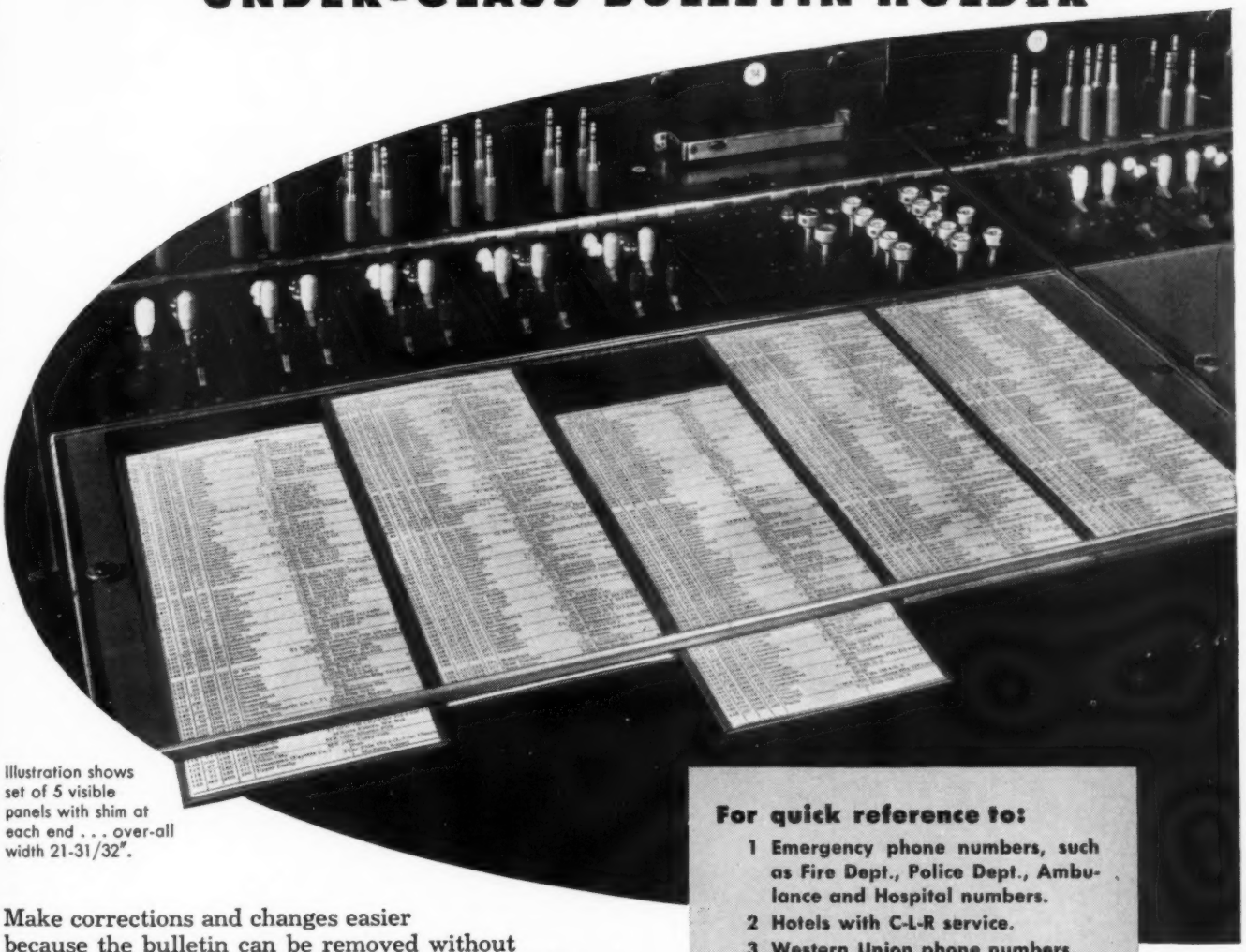

Illustration shows set of 5 visible panels with shim at each end . . . over-all width 21-31/32".

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For quick reference to:

1. **Emergency phone numbers, such as Fire Dept., Police Dept., Ambulance and Hospital numbers.**
2. **Hotels with C-L-R service.**
3. **Western Union phone numbers.**
4. **Telephone numbers of local companies receiving frequent long distance calls.**
5. **Frequently called direct circuit points and tributaries.**
6. **DSA Toll points.**

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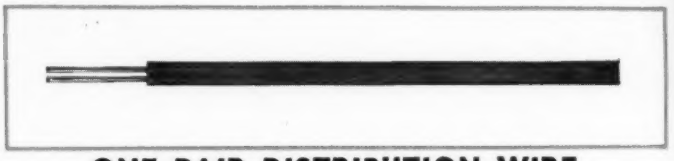

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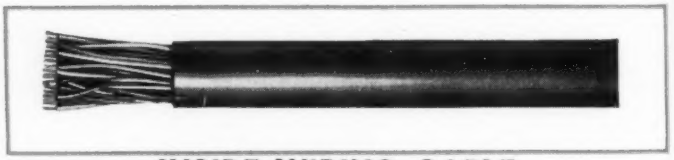

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THE NAME THAT MEANS WORK SIMPLIFICATION

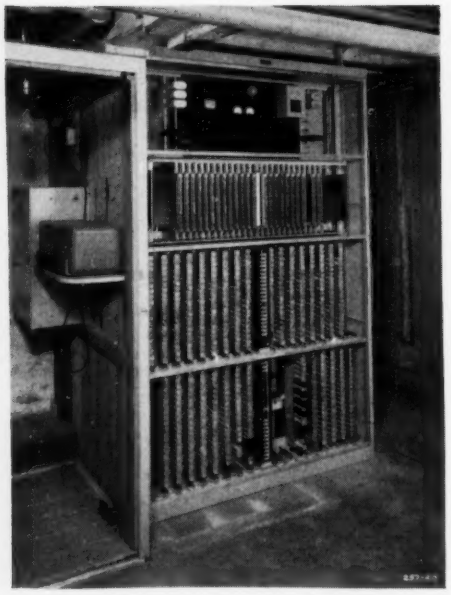
The Story of 3 Leich PABX'S...

and the Friends They Made

FAIRFIELD, IOWA — Three businesses in this growing Iowa town of over 7,000 people have Leich PABX installations. Here's the story of why they're making friends among the Fairfield people who use them.

The United Telephone Co. of Iowa in Fairfield installed them at American Chain and Cable Co., Parsons College, and Louden Machinery Co. The two 40A PABX installations and 88A PABX have given these companies efficient, fast business telephone service. They're pleased with the greater traffic capacity, faster extension of calls, and variety of service features these PABX's offer.

You can make customer-friends, too, by recommending Leich PABX installations. Write for more information today.



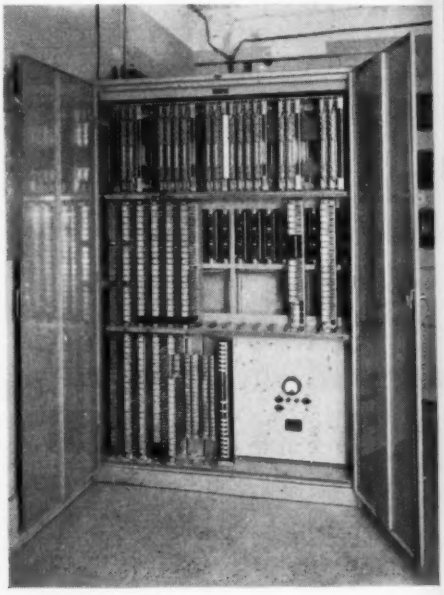
1. The folks at Louden Machinery Co. work with a Leich 88A PABX. Louden manufactures monorail and crane equipment for material handling, as well as equipment for farm buildings. Its modern Leich switchboard has an optional conference call circuit and a paging circuit.

The paging circuit allows any inside telephone to dial a number which connects them with a DuKane paging system. The caller can then vocally page anyone throughout the company.

This Leich 88A PABX is equipped with 78 lines, 9 local links, 5 city trunks, and the compact Leich attendant's turret. Ten more lines and 3 city trunks can be added.

2. The Leich 40A PABX switchboard shown here is at American Chain and Cable Co. This plant manufactures cable controls and assemblies for the automotive and aircraft industries.

Their Leich PABX is equipped with 30 lines, 5 local links, 5 city trunks, and a keyset turret. The capacity of the 40A is 40 lines, 6 local links, and 10 city trunks. Local links are not tied up on extension dialed calls to city trunks.



3. Parsons College also has a Leich 40A PABX. The Leich attendant's turret offers faster, easier extension of incoming city trunk calls. The all-relay Leich dial switchboard furnishes dependable switching with a minimum of maintenance. It's modeled after the famous Leich Dial System.

The Parsons College 40A PABX has 40 lines, 4 city trunks, and 4 local links.

WRITE FOR MORE INFORMATION ON LEICH PABX'S TODAY

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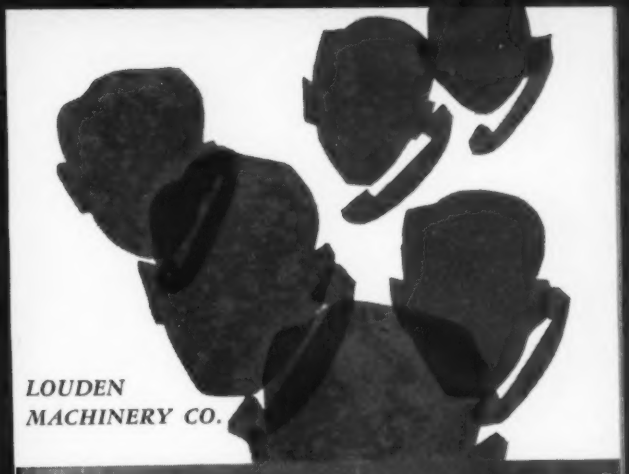

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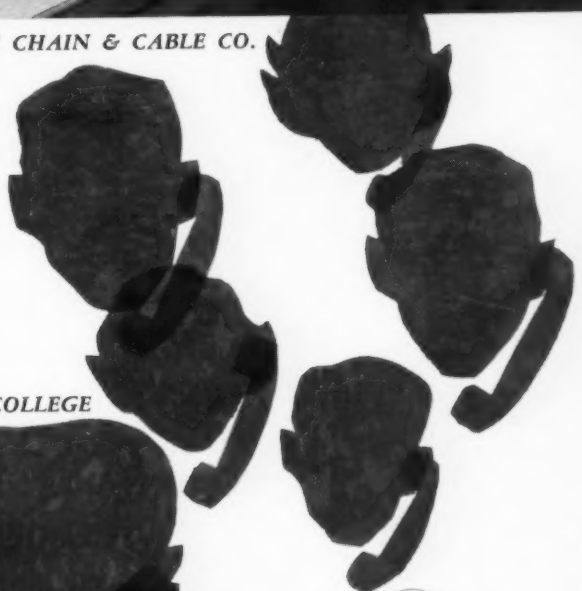

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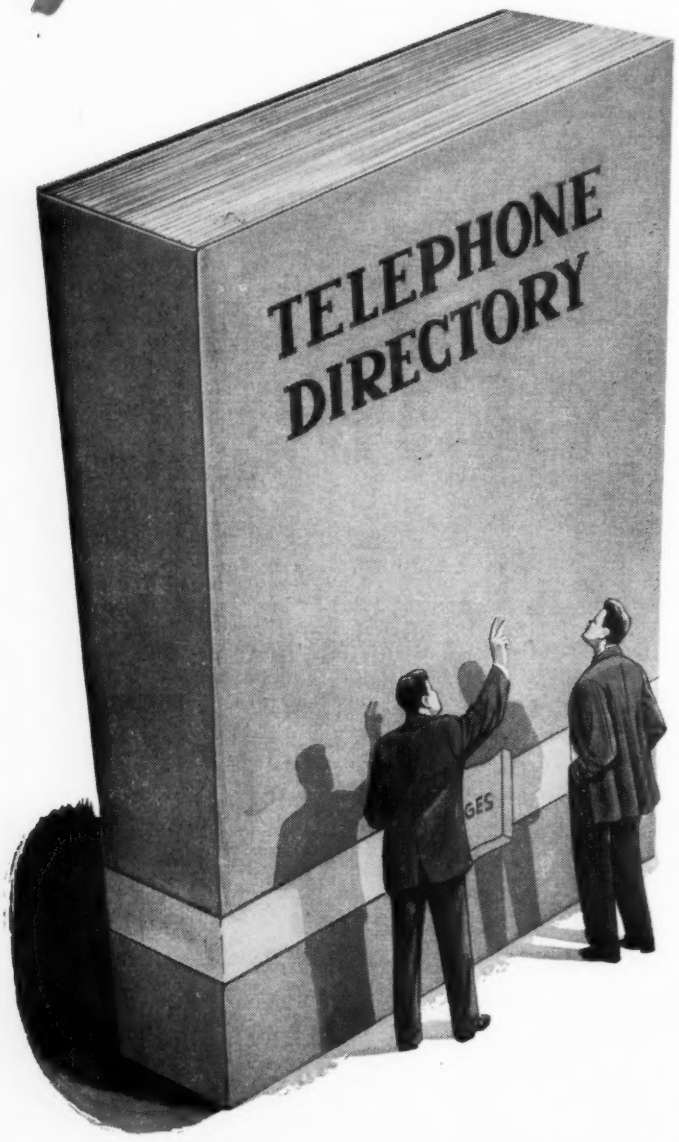

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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

Independents testify at FCC hearing on allocating radio frequencies above 890 megacycles. Maine Legislature repeals "present fair value" rate base requirement. REA changes requirements covering interest and principal payments.

THE IMPORTANT hearings before the full Federal Communications Commission (FCC) on the general allocation of frequencies above 890 megacycles got under way recently. And the numerous parties—about 70—will probably take the best part of the summer to give their reasons why they should be assured of a fair share of these increasingly important microwave channels.

The telephone industry, both Bell and Independent, is not only seeking to establish their right in this area of the radio spectrum for future operating telephone industry purposes, but it is also fighting off a very desperate counterattack by other would-be industrial users. These include the oil and gas pipelines and other utility companies desirous of conducting their own microwave comunications systems. In fact, the telephone industry is being accused of trying to hog the whole field of microwave.

The Independent side of the story was told by Donald C. Power, president of the United States Independent Telephone Association, as well as of the General Telephone Corp. Cyrus H. McLean, chairman of the USITA Engineering Sub-committee on Radio and Carrier; M. L. Donaldson, chief engineer, Peninsular Telephone Co., Tampa, Fla.; and Paul H. Henson, chief engineer, The Lincoln (Neb.) Telephone & Telegraph Co. Col. William C. Henry, president of the Northern Ohio Telephone Co., Bellevue, O., also made a persuasive statement for the record, although unable to attend the hearings in person.

Mr. Power led off the Independent witnesses by reviewing the tremendous growth and increasing importance of the nation's telephone system, especially since the end of World War II. He also referred to the changing character of modern telephone operating technique and the steady trend towards radio and microwave as well as electronic phenomena, in contrast with former conventional land wire installations.

He pointed out that Section 1 of the Communications Act requires the commission to make available to the people of the nation wire and radio communication services with adequate facilities at reasonable charges. He said there has not been adequate provision made for telephone common carriers as compared with the need of the telephone industry, adding:

"Independent telephone companies, as regulated utilities, are particularly concerned that the commission is considering the possibility of licensing private communications systems, utilizing radio as the medium, to operate in a field traditionally handled by telephone company common carriers in the interest of the general public.

"Authorization of private point-to-point microwave systems where telephone common carriers are ready, able and willing to provide the necessary facilities whether by wire or radio is, of course, a matter which the commission must determine in accordance with the public interest, convenience and necessity.

"However, as the commission is aware, the authorization of private point-to-point microwave systems under these circumstances would have a detrimental effect on the ability of telephone companies to serve the public interest.

"Such action would not be in accordance with a policy of preserving and protecting telephone common carrier service for the public benefit and would encourage persons desiring to establish private systems.

"The commission would be put in the position of fostering private systems which would in effect result in cream-skimming operations. In many instances, proposed private systems would parallel existing routes from which a number of Independent companies obtain a substantial portion of their revenues."

Concluding his testimony, Mr. Power pointed to the steady migration of our population from urban to less populated areas. Referring to the financial burden of the telephone industry in meeting the demands of public service, Mr. Power said that if existing subscribers are able to substitute their own private system for existing telephone facilities, the telephone company security will be affected.

He stated that if the commission should adopt the policy of allowing private systems to compete with telephone company service, the result would be extremely serious and destructive from the standpoint of public interest. He concluded by showing that telephone industry use is uniquely suited to the maximum utilization of the spectrum.

Colonel Henry's statement dealt with the actual use being made, or proposed to be made, of microwave frequencies by Independent companies. He said that 16 of them, including his own, had an investment of $6,811,644 as of April 1957. He said that the frequencies above the 890-940 band were best suited for Independent telephone company use. He included a list of the 16 Independent companies and the extent of the investment each has made in microwave equipment.

Cyrus H. McLean disposed of the competitive argument that telephone companies ought to stay with wire facilities wherever possible. He said that such a policy would tie the telephone industry to horse and buggy methods in an electronic age. McLean said:

"It is a well-known fact that telephone common carriers currently provide extensive leased wire service for such classifications as program transmission, press service, broker service, transportation reservations and many others and, in addition, lease many private talking and control channels to a large cross-section of business and industrial firms throughout the country.

"This is an important source of revenue to telephone common carriers and is taken into consideration in setting the rate base applicable to all telephone subscribers.

"Common carrier telephone companies are better able to provide this type of integrated leased service than any other entity, as they employ, for the most part, a standard telephone type of plant.

"It is only since radio has become an important communications medium that there has been any desire on the part of business entities to provide their own telephone facilities. . . ."

M. L. Donaldson gave engineering testimony, largely based on operations and experience of his own company in Florida-Peninsular Telephone Co. He also referred to technical reasons why telephone companies are in a more advantageous position to utilize frequencies and operate microwave communications systems.

Paul H. Henson, another USITA engineering witness, discussed the use of microwave telephone operations in Nebraska by The Lincoln Telephone & Telegraph Co. He stressed the importance of using microwave in toll connecting circuits.

Rate Base Legislation

Contrary to the recent action of the Minnesota Legislature in revising the regulatory law of that state so as to require some recognition of current value in telephone rate-fixing, the Maine Legislature has marched off in the opposite direction. Maine is the first state since the end of World War II to adopt legislation repealing present fair value rate base requirements for state commissions. It has been tried before without success (Ohio, New York and Maryland), and it has failed before in Maine. The latest bill grew out of the continued dissatisfaction of the Maine commission with a 1953 decision of the state supreme court requiring some recognition of current value. Maine's Democratic Governor Muskie was believed likely to sign the measure. The new law removes "current value" as one of the factors the commission must consider in valuing property for utility rate-making.

Governor Harriman (Democrat) has called a special session of the New York Legislature. Included in his call was a demand that the Republican-controlled legislature again consider

REA Approves Loans in Four States

More than 1,500 families in rural areas of four states will receive new or improved telephone service as a result of $728,000 in loans made the week of May 26 by the Rural Electrification Administration, the U. S. Department of Agriculture announced on June 5. The loans were made to borrowers serving rural areas of Alabama, Arkansas, Illinois and Texas. About 975 of the families who will benefit from the loan funds do not now have any telephone service. Details of the loans follow:

Palo Pinto (Tex.) Telephone Co.; $45,000, second loan (May 27).

The borrower proposes to use these funds to finish up the system as originally planned, to provide facilities to serve nine new subscribers in the area, and to purchase and remodel a building for a combined headquarters and automatic central office building in Palo Pinto. Four miles of new line will be added to the system.

The loan brings the total of REA loans to the borrower to $253,000, which will enable it to provide new and improved service to 460 rural subscribers. The system will consist of 155 miles of line and three exchanges. The Palo Pinto and Millsap exchanges are scheduled for cutover this fall, and the Possum Kingdom Dam areas is already receiving dial service.

Northern Arkansas Telephone Co., Flippin, Ark.; $17,000, second loan (May 28).

At present, construction of automatic central offices at both Flippin and Bull Shoals is under way. The borrower plans to use these funds to alter the Flippin building to include space for headquarters facilities, and to add additional work and storage space in the Bull Shoals building. Originally, the company had expected to rent headquarters facilities for the system.

The two REA loans to this borrower totaling $183,000 will enable the borrower to offer new and improved service to 438 rural subscribers.

Peoples Telephone Co. Collinsville, Ala.; $170,000, third loan (May 29).

The borrower proposes to use these funds to provide automatic facilities to serve 307 new subscribers not included in prior loans. More than 1,900 subscribers now receive dial service from the borrower's central offices at Centre, Collinsville, Crossville, Leesville, Sand Rock and Wharton.

The three REA loans, which total $1,171,000, will bring new and improved service to 2,492 rural subscribers.

Wabash Telephone Cooperative, Louisville, Ill.; $242,000, second loan (May 29).

The Illinois borrower proposes to use these funds to bring service for the first time to 319 farm families, and improve service for 232 existing subscribers. As a center for the new service, the cooperative plans to acquire the properties of the Farmers Mutual Telephone Co. at Geff, Ill. This subscriber-owned system provides magneto service over 46 miles of line. The acquisition will be made through the issuance of membership certificates.

New automatic central offices are scheduled at Crisp and Geff.

The loan brings the total received by this borrower up to $859,000 with which it expects to provide new and improved service to 2,004 subscribers. The system will consist of 540 miles of line and five exchanges. The Bible Grove, Xenia and Louisville exchanges are in operation serving 962 subscribers.

Lakeside Telephone Co., Tyler, Tex.; $254,000 first loan (May 31). The borrower proposes to use these funds to convert its common battery system, serving 318 subscribers, to dial operation and to provide facilities to serve 337 farm families now without telephones. A combination commercial and automatic central office at Maud will be added. A portion of the loan will be used to refinance existing indebtedness of the borrower.

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the bill to nullify a state court of appeals decision requiring the public service commission to consider replacement cost in fixing telephone rates. A similar bill has failed in the last two regular sessions. The main purpose of the special session was to consider an increase in workmen's compensation and unemployment benefits. Republican leaders may disregard the governor's request with respect to reconsidering telephone rate-making legislation.

Capital replacement has been recognized as a serious problem for many years, especially in the telephone industry. But, there is evidence that non-utility business is facing a serious dilemma because of inflation and the fact that they have followed the vogue of using original cost records as guides for planning revenue requirements, operating budgets, and the pricing of products.

"The Guaranty Survey," a very respected monthly in financial circles (published by the Guaranty Trust Co. of New York), has the following to say in its May 1957 issue about the dilemma of capital replacement:

"A quarter century of monetary depreciation has created a host of problems, but few more perplexing to businessmen or more menacing to orderly economic growth than that of financing the replacement and expansion of industrial plant and equipment.

"Obviously, depreciation reserves based on the original cost of capital goods will not be large enough to replace these goods if the cost of replacement has been increasing.

"In the course of a sustained period of steadily rising costs, the deficiency can become an extremely serious matter, as more and more businesses are discovering.

"The problem is aggravated by the continued use of accounting practices and tax policies founded upon the traditional assumption that money is a dependable standard and store of value over long time intervals, an assumption which the experience of recent years has belied.

"Some industrial managements are now in a real quandary over how to finance needed capital expenditures for which no adequate provision has been found possible and are calling upon government to re-examine the concepts of depreciation and profit underlying the revenue laws."

"The Guaranty Survey" went on to point out that after World War II some industrial managements began to feel depreciation was understated and profit correspondingly overstated because of the traditional practice of charging depreciation on the original cost basis. It added: "This view received little support from the accounting profession." It received no sympathy whatever from the treasury or from regulatory agencies, all seemingly under the spell of their own bookkeepers. There were a few suggestions about stating the reality of rising replacement costs in footnotes or other supplemental references in financial statements. All this time the Department of Agriculture has been using a current-cost depreciation in calculating production costs of farmers, for purposes of handing out of the treasury certain rural benefits.

"The Guaranty Survey" had its own solution, however. It says that the problem of capital replacement "must be met head on." It stated:

"It is not necessary to disturb time-honored definitions of depreciation and profit. Capital replacement is more a problem of practical business finance than a question of accounting terminology.

"Instead of permitting depreciation reserves in excess of original cost, the purpose would be adequately served by tax-free accumulation of funds under some other name, such as special replacement reserves, for example.

"The additional funds must be set aside for replacement in any case, and it is both unfair and economically destructive that they be taxed as ordinary profit by the very government that has created the difficulty by failing to maintain the value of money.

"When the state of federal finances makes tax relief possible, this would be an excellent place to begin."

In other words, if government is primarily responsible for the stability or instability of the dollar, it behooves government to correct, so far as possible, the inequities and hardships arising from instability. According to the Machinery and Allied Products Institute, which has developed an index of prices of business capital goods (plant and equipment), the average cost of such goods approximately doubled between 1933 and 1947. Then, instead of flattening out as was generally expected, prices continued to rise at the same annual rate, registering a further increase of nearly 50 per cent at the present time. In other words, average original cost of plant has approximately tripled since 1933.

REA Borrower's "Honeymoon" Shortened

Although Congress is not expected (by this writer) to take favorable action on President Eisenhower's suggestion that the Rural Electrification Administration's 2 per cent interest rates should be increased, a recent bulletin by REA to all borrowers suggests that REA would like to pull in the purse strings a little bit, aside from the 2 per cent interest rate. This bulletin, dated June 5, is entitled "Change in Method of Handling Interest and Principal Payments on REA Loans."

The bulletin affects the repayment by borrowers of interest and principal during the earlier years of loans (frequently called the honeymoon period). Requirements have been made somewhat less liberal, even though the 2 per cent interest rate has not been changed. In the past, REA allowed a new borrower very liberal concessions during the "honeymoon period" on the repayment of principal and interest. This was in order to enable the new borrowers to get their plants completed and seasoned in operation and actually producing a fair volume of revenue before assuming the full burdent of instalment payments.

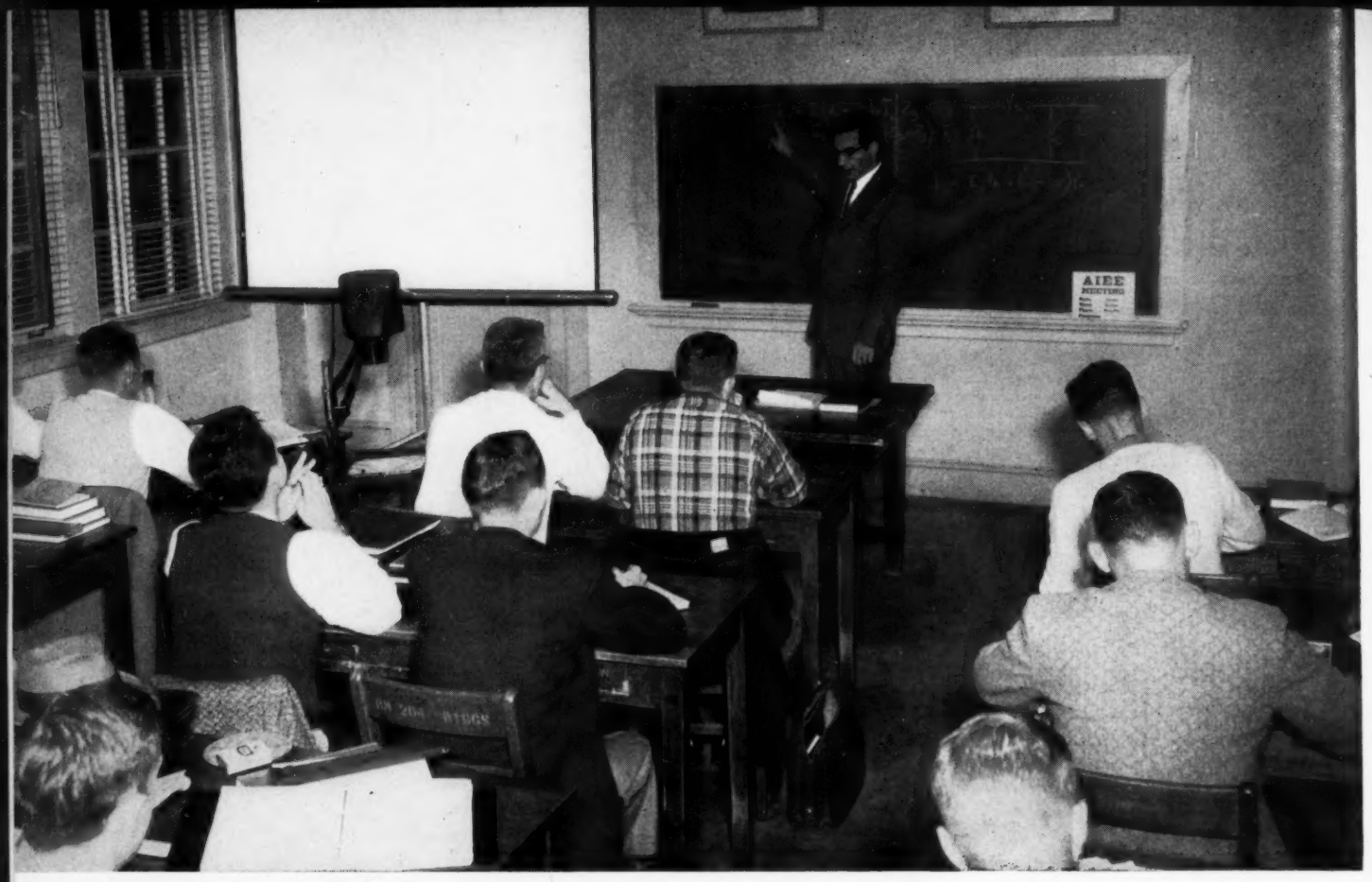
In the past, REA allowed a honeymoon period of three years on telephone loans, starting from the date of the borrower's note. This period has not been shortened, as far as repayment of principal is concerned. But, from now on, interest payments are going to start right away and will be paid in quarterly instalments as the interest accrues. This brings the REA method of collecting future REA loans into line with general practice—in and out of government—of applying payments on loans. Furthermore, under this practice, which is known as the United States Rule, all interest must be paid as of any given date before payments are applied on principal of the loan.

In the past, payment of interest was postponed during the early part of the loan. And after that accrued interest was paid back by instalments over the remaining life of the loan.

REA does make one concession in its latest bulletin—permitting loan funds to be used for interest payments during construction and development. In other words, a borrower who needs X dollars in the *principal* amount of a loan, to finance a rural telephone project, and who must also pay back Y dollars for *interest* during construction and development, in what is called the honeymoon period, may now obtain a loan of X plus Y dollars. In this way, the borrower will be able to meet its interest obligation as it accrues, without dipping into principal funds held for construction and development purposes.

Statism Beclouds Issues

"As long as the easy, attractive, superficial philosophy of statism remains in control of the citizen's mind, no beneficial social changes can be effected, whether by revolution or by any other means."—EDITORIAL STATEMENT, *Los Angeles Times.*



Students in Southern Bell's Communications Engineering School listen as a Clemson College professor explains engineering equations during a classroom lesson.

Clemson Conducts School for Bell

South Carolina's renowned engineering college opens doors to Southern Bell's Engineering Course—organized and financed by company.

By RALPH M. PAYNE*

CLEMSON COLLEGE, South Carolina's nationally renowned engineering institution, has opened the doors of a new school with a curriculum as unique as its enrollment is exclusive.

The school is the Southern Bell Telephone & Telegraph Co.'s Communications Engineering School — originated, organized and financed by the nine-state Bell company.

The curriculum of this unusual school includes courses covering such subjects as sound and hearing, passive and active electric networks, filters and wave guides. The course of study has two major divisions—theory and theory application.

Students for the school are drawn from Southern Bell's engineering and plant departments, and each holds a degree in electrical engineering or has the equivalent in experience.

The first term of the school began Mar. 4 of this year. But almost a year of planning had preceded this initial meeting of teacher and student.

In early 1956, discussion within Southern Bell's engineering department centered on the need for setting up a comprehensive training program for engineering trainees. Young engineers were receiving on-the-job instruction and practice, but insufficient formal training was being held.

Out of these departmental discussions came the decision to obtain outside, academic appraisal of the existing training setup before attempting to revise it.

Dr. Leonard C. Adams, associate professor of electrical engineering at Clemson College, was engaged by Southern Bell to carry out this job. At the end of three months of interviews and observation, he submitted his report to the company.

Dr. Adams suggested that Southern Bell adopt a five-year educational program. Among six objectives he outlined were those of providing job-related technical schooling for all trainees and of providing instruction in fundamental sciences for men without engineering degrees. He suggested that the company seek the help of a college in administering part of this program.

Meanwhile, a steering committee of

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transmission and protection engineers from several Southern Bell states was involved in planning a training class in transmission engineering. The group decided upon a course which would cover both theory and its application.

In the past, such courses had been offered on an irregular basis, but a good many years had passed since one had been conducted. These courses had been nine to 10 weeks in length, with instructors chosen from among company personnel.

The steering committee knew that Southern Bell again could provide teachers for the projected new class, but it thought that a college might perhaps be better equipped to offer the theory phase of the training class. A college would not only have trained instructors, but the plant necessities for housing the students and an atmosphere conducive to study.

If a college would cooperate in the program, the committee reasoned the company would benefit by being able to keep productively on the job those engineers who had previously served as instructors.

At this point, Southern Bell approached Clemson College to see if it would take part in the transmission engineer training activity.

Clemson — a 68-year-old, state-endowed college with an enrollment of 2,700 — gave a cordial reception to Southern Bell's proposal. Its electrical engineering department could provide instructors; it had sufficient space; and furthermore, its administration was eager to help the company in setting up the course.

Working together, the steering committee and the college set about planning a program of study for selected candidates. Dr. Adams, who had reviewed the company's training program, was called into action again as a coordinator between the company and the school.

For the sake of continuity and convenience, the entire program of study was organized into four terms. The first term—covering the theory phase of the course—was set to run for three weeks. The second, third and fourth terms — covering theory application — were designed for two weeks each. The four terms were not to be offered in sequence. Six consecutive sessions were planned for the first term, to be followed by an equal number of second terms and then as many third and fourth terms.

Since students in the course would have either college degrees or extensive experience, study was set at college senior and postgraduate levels.

The first, or theory, phase was planned on the basis of 72 hours' classroom and laboratory instruction, with five members of the college's electrical engineering school faculty serving as instructors. Courses were organized by the instructors themselves from a broad outline of subjects and time allotment for them suggested by the Southern Bell steering committee. The instructors also selected the textbooks to be used in the course from a list furnished by the committee.

Today the program for the first phase includes six subjects: Acoustics, Information Theory, Transmission Lines I and II, and Active Elements I and II.

The class in Acoustics has been organized for six classroom hours. Topics covered are sound, speech and hearing, acoustical noise, fundamentals, general theory, electro-acoustical devices and telephone receivers.

Information Theory, a six-hour course, covers data transmission, pulse code modulations of carrier systems and related subjects.

Transmission Lines I, held in 18 classroom hours, includes passive electric networks, problems and demonstrations on passive electric networks, and electric wave filters.

In Transmission Lines II, 18 hours are devoted to transmission line theory, transmission line impedances, termination effects, audio-frequency lines, loading, R-F lines, and wave guides.

Active Elements I, a 12-hour course, covers vacuum tubes and transistors.

And Active Elements II schedules 12 classes for study of magnetic amplifiers, low-pass vacuum-tube amplifiers, band-pass amplifiers, negative feedback amplifiers, and special amplifier types.

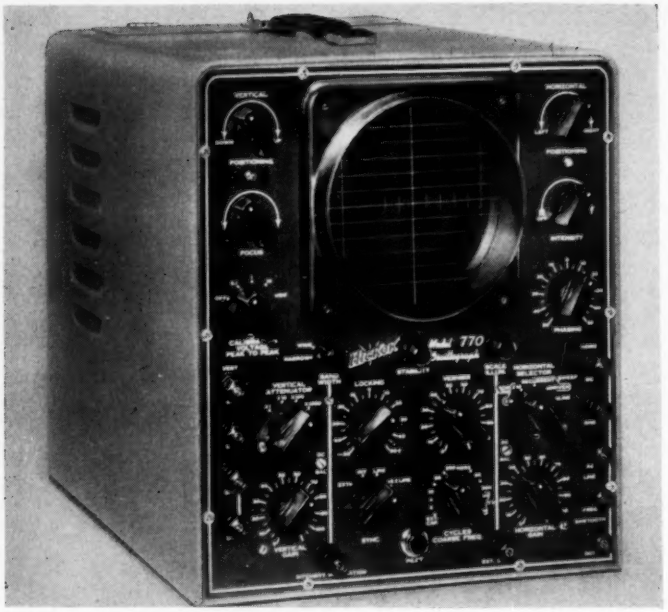
The schedules for these courses include periodic examinations and homework assignments at least equivalent to classroom time.

Planning and organization for the second phase, the first session of which is set tentatively for September 1957, is now about complete. Its subject matter will include structural and inductive coordination and protection and corrosion. Classes will be taught by both Clemson and Southern Bell personnel.

The first students selected to enter

(Please turn to page 50)

Southern Bell's Chief Engineer R. G. Elliott (right) solves a problem with the help of a slide rule during a dormitory visit to students in the company's Communications Engineering School at Clemson College. Pictured, left to right, are J. D. Howard Jr. of Atlanta, Ga., Oren Long of Columbia, S. C., S. H. Gayes of Louisville, Ky.



A medium-priced cathode ray oscilloscope of engineering quality is this Hickok Model 770. In addition to the usual vertical and horizontal amplifier and sweep controls, this instrument has a built-in voltage calibrator, and a horizontal selector which provides driven as well as recurrent sweeps.

Use of the Oscilloscope in Telephony

By **HAROLD B. McKAY, TELEPHONY'S Electronics Editor**

PART 3

PREVIOUS articles in this series dealt with the operating principles of the cathode ray oscilloscope and the various features and refinements found on different instruments. This part deals with some specific applications of these instruments to telephone problems.

In the preparation of these articles various books on the use of the "scope" were consulted. A list of these will appear in the bibliography at the end of the series. Most of these books contain a wealth of information on the use of the instrument in servicing television sets, but very little was found concerning the telephone field.

Therefore, an oscilloscope was borrowed and brought to a telephone office and many tests were made on different types of apparatus to determine if the "scope" could do a job better or in less time than with regular methods. These articles are a report of the thinking and results of these tests. It is recognized that this can only be a beginning, and the results which follow are far from complete. Indeed, the use of the oscilloscope seems to promise a whole new approach to electrical problems in the telephone field.

In selecting an instrument it was decided to get one with a built in voltage calibrator and facilities for a driven sweep. The latter was deemed necessary because many telephone circuits have extremely low pulse rates, and trains of pulses, such as from dialing, are of short duration. Therefore, there would be no time to try to get an ordinary recurrent sweep circuit to synchronize with the pulses.

Further, in changing from one circuit to another, the pulse rate would vary slightly. The driven sweep was felt to be the best because it could be made to lock in on pulses with a broad frequency range and still give a stationary pattern. Also required were an ac and dc input amplifier and facilities for intensity modulation.

The borrowed oscilloscope was a Hickok Model 770 which is a medium priced instrument and which contains all the features which were felt desirable for the tests to be made.

General Tests

Certain tests of a general nature could be made upon almost any type of equipment or line that carries messages. These include distortion, wherein the wave shape entering a piece of apparatus or a line undergoes a change and is seen to look different on the "scope" when it emerges. In radio work this is usually done with a square wave oscillator. However, equipment was not available at the time to make this type of test. (A future article will explore this further.)

Intermodulation can occur on any type of circuit—carrier, repeater or otherwise. When it happens, frequencies which are not related to each other interact and produce new frequencies. This condition produces waveforms which can be recognized.

Gain—Loss. These qualities are of interest in carriers, repeaters, wire lines and separate pieces of equipment. Using an oscillator as a voltage source,

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any line or piece of apparatus can be made to transmit an alternating current and the output measured with an oscilloscope. In this case the scope functions as a voltmeter and shows the gain or loss at the different frequencies. This will work at voice or carrier frequencies.

Noise appears on the screen of a cathode ray oscilloscope as a ragged line sometimes called "grass" or "white noise" by radar men. It represents random voltages from thermal or atmospheric sources and has no steady pattern (see *Fig. 3.1).*

However, noise which originates in some specific piece of apparatus may carry a recurrent pulse which will give a clue to its source. Noise from commutation on a dc generator may have a component, or series of peaks on a "scope" presentation which will be indicative of the rate at which the commutator bars pass the brushes (see *Fig. 3.2).*

Noise from fluorescent lamps or mercury arc, or other negative resistance type rectifiers, may display a 60-cycle rate in the noise pattern which can be identified from the peculiar distortion of the 60-cycle wave shape. Sixty cycles can interfere on carrier systems only when a harmonic high enough to enter the carrier filters is present. This may result in a series of spikes in the pattern on the scope. The pattern itself may not be indicative of 60-cycle power, but the fact that the spikes occur at a 60-cycle rate will be the clue.

Fig. 3.1. Random noise looks something like this on a scope screen. It is raggedy and without a definite pattern.

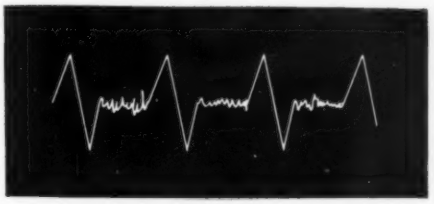

Fig. 3.2. A raggedy noise line may be accompanied by regularly spaced peaks which may indicate that 60-cycle power or commutator ripple is also present and may be contributing to the noise.

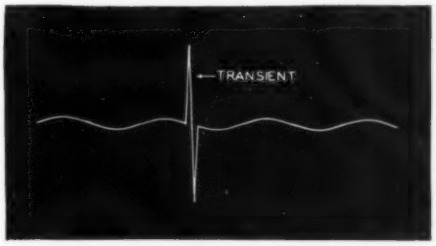

Fig. 3.3. A "hit" like the spike shown here is characteristic of impulse noise. Such transients flash at random on the screen, usually don't repeat at the same spot. They don't bother voice operation much, but can cause errors on IBM or SAGE circuits.

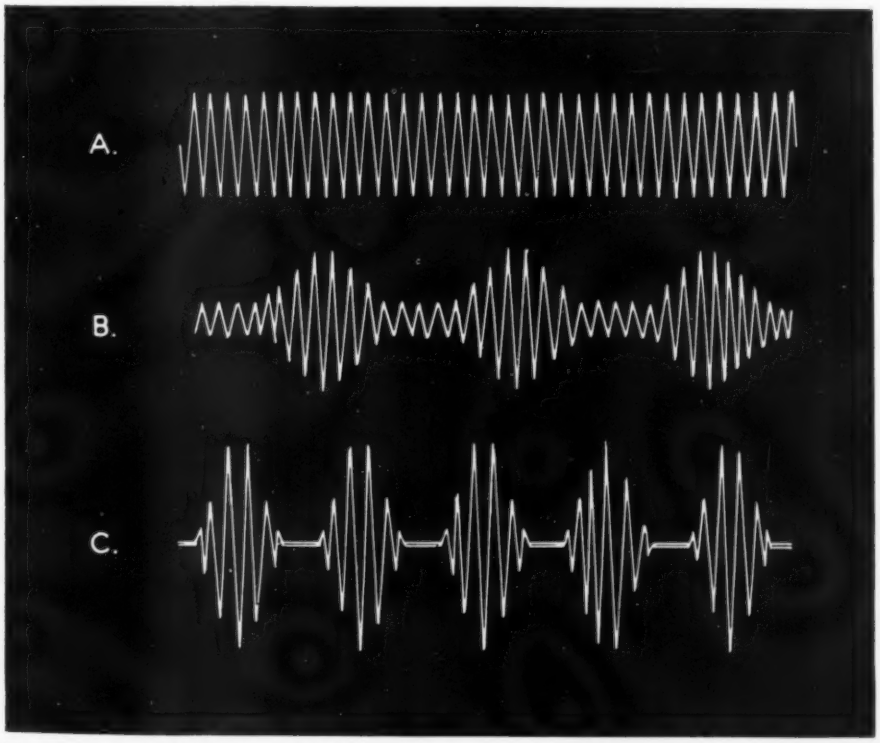

Fig. 3.4. Simplified presentation of carrier on an oscilloscope. (A) is the carrier current alone. (B) The large peaks and valleys are caused by modulation with a tone. (C) Overmodulation causes flat spots in the valleys which chop off the carrier and cause interference in other channels and systems.

Another form of noise or crosstalk can occur from spurious oscillations of any sort. These might occur in carrier or repeater apparatus due to a defective part or a non-linear condition. Normally, the spurious voltage developed would add to the other voltages present and could not, therefore, be detected with a regular meter. Such a condition is readily apparent on a scope where the frequencies present can actually be seen.

Impulse noise or hits can be seen on a "scope" even when they are of such short duration that they cannot register on a voltmeter or noise measuring set. The increased use of IBM equipment and SAGE circuits has made the oscilloscope a necessity in many offices because it is the only instrument which will measure these noise peaks. On the "scope" they appear as sharp spikes which may go completely off the screen (see *Fig. 3.3).*

Crosstalk between circuits of any kind can often be identified by placing a characteristic tone or alternating current upon the suspected circuit and then looking for it to appear on the circuit where the interference is being experienced. This can be done with a "scope" and traces of the test signal actually seen as they come in where they don't belong.

Carrier

In addition to the conditions mentioned above, carrier systems offer an opportunity to use an oscilloscope in such applications as the following:

Frequency measurements on single sideband suppressed carrier systems, where the demodulator oscillator must be set at the same frequency as the modulator oscillator, can be made quickly by using the "scope" as a frequency comparing device (Lissajous Figures; see Part 1).

Spurious harmonics from a lower carrier channel may fall in the band of a higher channel. The presence of such harmonics can be detected by wave analysis on a scope.

Voltage measurements at carrier frequencies are easily made on the cathode ray oscilloscope. Relative voltages of good and bad channels can be studied as can attenuation or loss in different circuit components.

Filters can be tested with a "scope." The wave shape, band pass, tuning and losses of carrier filters can be determined easily by sending a signal from an oscillator through the device and observing the output visually.

Loss-frequency characteristics of the line, repeaters, or the over-all system,

(Please turn to page 26)

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can be checked by a variable frequency oscillator and a scope.

Modulation on a carrier can be checked by a technique used on radio transmitters. Ordinarily a carrier can be checked by placing a probe from the vertical plates of the scope in some part of the carrier circuit where the carrier current exists. This might be at the equipment side of the line filter. If placed on the line side of the filter, all carrier channels present on the line would present a composite figure of some sort.

If placed on the equipment side, the probe would pick up the one channel only. The trace on the scope would look something like *Fig. 3.4 (A)*. The vertical lines from the carrier voltage may or may not appear separate, depending on how high the carrier frequency is.

If modulation, such as 1,000-cycle tone is placed on the carrier, a figure like that in *Fig. 3.4 (B)* will appear on the screen. The large peaks and valleys are caused by the modulation. This is called the envelope. Inside this envelope, the carrier waves will still appear.

When a modulation voltage is excessive, over-modulation occurs as shown in *Fig. 3.4 (C)*. Under these conditions the valley of the waves flattens out, and actual cut-off of the carrier occurs and spurious harmonics can result which will radiate all over a system and cause interference and crosstalk. This can happen in a radio system as well as a telephone carrier.

Trapezoid Pattern

The foregoing method will work satisfactorily to check modulation percentage as long as a straight tone is used for modulation. As the power of the modulation is increased, the valleys of the envelope become deeper until they flatten and cut off as shown.

If voice is used as modulation, a clear pattern like that in *Fig. 3.4* will not result, because the voice is composed on many frequencies which are constantly changing. As a result, the pattern on the screen would not stand still long enough to recognize anything.

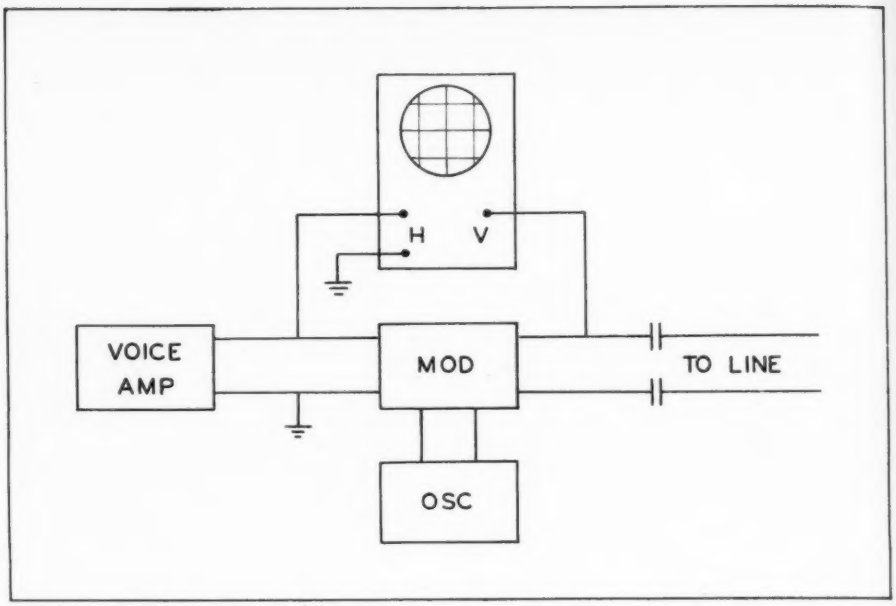


Fig. 3.5. Connecting an oscilloscope to a carrier system in this manner will show modulation as a trapezoidal pattern. The horizontal plates should be connected to the modulating voltage only. The vertical plates should be attached to the combined carrier and modulating voltages after modulation has taken place.

A method must be used, then, which will show the amount of modulation, independent of the frequency of the voice or other modulating voltage.

By connecting the "scope" up to the carrier as shown in *Fig. 3.5*, a different pattern can be obtained. In hooking up the scope this way, the main requirements are that the horizontal plates be connected to the voltage that is doing the modulating. The vertical plates should be connected to the resulting carrier and modulation combined.

The actual points of connection will vary with different kinds of carriers but the idea is that one set of plates in the "scope" should get the voice only, and the other plates the voice plus carrier.

The resulting images will look like those in *Fig. 3.6*. Here the trapezoid shape changes with the amount of modulation, but stays positioned on the screen. As the voltage of the modulation increases the figure becomes more pointed. *Fig. 3.6 (A)* is modulation less than maximum. (B) is 100 per cent modulation and (C) is overmodulation.

Although this pattern will rapidly change under voice modulations, it is easy to watch and see if it ever reaches a sharp point, which is the danger zone.

The exact pattern obtained in any of the above means of presentation may vary with the type of carrier, the method of modulation and trouble conditions in the system. In preparing the above, experiments were made on a double side band, unbalanced modulator 12-channel system equipped with compadors.

The oscilloscope appears to be useful in tracking down performance of the voice input, compressor, modulator and carrier producing components. The instrument gives a visual presentation of every part of the system with very little effort.

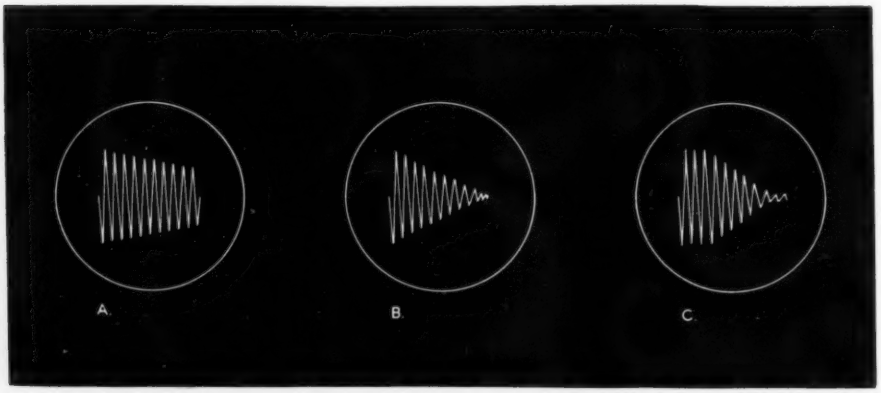


Fig. 3.6. Modulated carrier presented as a trapezoid shape. (A) is normal modulation, less than maximum. (B) is 100 per cent modulation. (C) is overmodulation. This pattern may end in a point, or a trailing line.

Repeaters

Voice frequency repeaters can be easily tested for over-all gain, or gain vs. frequency by means of an oscillator and a "scope."

In addition, distortion or spurious oscillation, or singing at inaudible frequencies will be shown up at once. Impedance matching and phase shift can also be made to give a presentation on the "scope," as can non-linear conditions of transmission.

(Please turn to page 52)

Officers and directors of the Indiana Telephone Association. Front row, left to right: LaMar Stoops of Nappanee; E. C. Mull of Knightstown; John Harbaugh of Sullivan; Roscoe Pontius of Rochester; C. D. Ehinger of Decatur; Francis Simpson of Winchester; L. H. Meyer of Fort Wayne; R. V. Achatz of Aurora; S. K. Trippet of Princeton. Second row, left to right: Robert Dwyer of Brookston; Charles Thomas of Roachdale; C. E. McCormick of Terre Haute; W. J. Scheidler of Greensburg; R. F. Lucier of Warsaw; John Goodwin of Brookville; R. R. Hirschman of Indianapolis; Virl Watkins of Princeton, and George A. Schumacher, secretary-treasurer. Frank E. Bohn of Fort Wayne; Harry S. Hanna of Indianapolis, and Bechtel Winger of Sweetser, were not present for picture.

Hoosiers Asked to Guard Against Government Ownership

By R. C. RENO

PRIVATE PUBLIC utilities under government regulation perform a better service than utilities under government ownership and operation, Dr. W. A. Paton Sr., professor of accounting of the University of Michigan, declared in an address before the convention of the Indiana Telephone Association, held May 8 and 9 in Indianapolis.

Prof. Paton warned his listeners that all utilities in this country must be on guard against the encroachment of government in their operations because in countries that have gone socialistic, utilities have been the first industry to become nationalized.

He pointed out that the popular thought that utilities are monopolies has been overworked for too many years. This is not true, he said, because all utilities are under forms of competitive pressure of one sort or another, such as buying goods and supplies on the same markets as others, and securing capital funds from the open market. He said the telephone business also has product competition such as the mail, radio, television and telegraph.

Dr. Paton also deflated the idea that regulatory commissions guarantee that utilities have a "riskless" business. Telephone companies, for example, he said, do operate as a risk business, and all regulatory commissions do is to provide a healthy area in which the companies can operate and then "it's up to the company."

"Utilities should have a zone of reasonableness in which to offset losses in connection with their operating hazards. When times are booming, utilities should have an opportunity to get a little fat to guarantee against lean years," Dr. Paton observed.

The Indiana convention was presided over by Association President Francis Simpson of Winchester and First Vice President Charles D. Ehinger of Decatur.

The two speakers at the first session of the convention emphasized public relations. Marvin C. Diefendorf of Fort Wayne, director of public relations for General Telephone Co. of Indiana, stressed the importance of maintaining personal contact with customers after an exchange has been converted to automatic operation. Harry R. Gruelle of Indianapolis, public relations supervisor of Indiana Bell Telephone Co., discussed new telephone products and services which have been introduced and are being developed and brought out ways and means of presenting them to the public in order to secure the widest possible use of the new products and services.

Following the morning session on May 8, the delegates met for a luncheon program at which P. W. Ross of Indianapolis, vice president of the Indianapolis Power & Light Co., was the featured speaker. Mr. Ross spoke on the subject "Satisfaction Guaranteed," in which he stressed the fact that to-

(Please turn to page 30)

First commercial communication facilities on Ocracoke Island come with the laying of Anaconda direct-burial cable.

Anaconda telephone cable beats

Wind-swept Ocracoke Island—home for 550 residents—lies 20 miles across Pamlico Sound from Engelhard, N. C. Anaconda cable makes possible all telephone exchange operations on 8-by-2-mile sandspit.

Carolina Telephone and Telegraph Company men cut Anaconda Direct-burial Telephone Cable for a pole connection. Cable lengths were made "to fit" to terminal locations.

XUM

Because of quicksand nature of soil and its tendency to crumble, a special cable plow had to be designed to do the job.

hurricanes on Ocracoke Island

Up hurricane alley, Ocracoke Island gets telephone service for the first time—with Anaconda direct-burial cable.

Since the days of Blackbeard, the pirate, in the early 1700's, Ocracoke Island inhabitants have been without direct communication with the mainland, 20 miles across wind-lashed Pamlico Sound to North Carolina.

Early in 1956, Carolina Telephone and Telegraph Company remedied this situation with a radio-telephone hookup. But not without a battle from Mother Nature.

Hurricanes sometimes whirl onto the island with speeds up to 125 miles per hour. And corrosive salt spray, sand-blast action of the winds, together with severe lightning conditions had to be contended with.

Solution was Anaconda Direct-burial Telephone Cable. This tough cable—with its special Anaconda polyethylene jacket—proved just the match for corrosive soil conditions, moisture and abrasive sand.

Whatever *your* needs, you, too, will find a good answer to your problems among Anaconda 1) Aerial and Duct cable, 2) Self-supporting cable, 3) Direct-burial cable, 4) Rural and urban distribution wire; or 5) Anaconda paper-lead cable.

Phone or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y., or any of our 27 District Offices. There's a qualified telephone-cable expert ready to help you.

57330

UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION

Phone the Man from ANACONDA®

for TELEPHONE CABLE

LEFT PHOTO: Congratulating Paul Wolf of Logansport, (second from left) winner of the Indiana association's Merit Award and switchman of General Telephone Co. of Indiana, Inc., are association president, Francis Simpson (left) of Winchester; L. H. Meyer (third from left) of Fort Wayne and Don E. Van Fleit, manager Garrett Telephone Co. Mr. Wolf saved the lives of four young people at Lake Maxincuckee, Ind., on June 24, 1956, and was awarded the associations Merit Award for "multiple heroism above and beyond the call of duty." RIGHT PHOTO: Prize winners at the Indiana convention's ladies' breakfast were, left to right: Mrs. Mary Bauer of Walkerton; Mrs. Myrtle Chew of Knightstown; Miss Lalah Amick of Fortville; Mrs. Corda Ratts of Worthington, and Miss Grace Nicholson of Valparaiso.

day, as compared with the war and immediate post-war periods, all businesses are advertising their products and services on a "guaranteed satisfaction" basis. This, he said, has been brought about by the increased competition during the past few years.

He urged all companies and individuals to adopt the motto "Satisfaction Guaranteed" to guide them in their personal and business activities. He listed four attributes for sustaining and supporting this creed of living, as follows:

(1) Understand and appreciate the value of a good reputation and guarding it once it is obtained.

(2) Have some sort of identity—if you do not have an identity, develop one by becoming a part of, or belonging to, an organization that is worth while.

(3) Have the vision to look into the future. Where there is no vision, a business will pass out of the picture or into other hands.

(4) Have pride in and loyalty to your company, the people with whom you work, and most important, "ourselves."

A feature of the banquet the evening of May 8, was the presentation of the Indiana association's 1957 merit award to Paul Wolf of Logansport, switchman for the General Telephone Co. of Indiana. Mr. Wolf rescued four young people from Lake Maxincuckee in Indiana on June 24, 1956, and was given the award for "multiple heroism above and beyond the call of duty."

The banquet speaker was Hugh A. Barnhart, president of the Rochester (Ind.) Telephone Co. and second vice president of the United States Independent Telephone Association. He told of the plans of the USITA for celebrating its 60th anniversary in the Fall and urged all Independent telephone companies to join in the celebration by featuring it in their local communities.

Mr. Barnhart also urged all companies which are not members of the USITA to apply for membership during the anniversary observance.

The last session of the convention on May 9 was opened by a report by Association Secretary George A. Schumacher. Mr. Schumacher traced the activities of the association headquarters in connection with representing the industry before the Indiana legislature, especially the effort to secure the enactment of a state bill to reimburse utilities for the cost of relocating their facilities made necessary by the construction of federal highways.

Hugh A. Barnhart, president, Rochester (Ind.) Telephone Co., and second vice president of the United States Independent Telephone Association, speaking at the banquet of the Indiana convention.

Following Secretary Schumacher's report, the convention heard an address by Indiana's lieutenant governor, Crawford F. Parker. He paid tribute to the telephone industry for its record of rendering reliable communications to Indiana and to the nation.

He also stressed the importance of Indiana's financially healthy and fair-tax climate for business in general. He pointed out that, under the state's constitution, Indiana can not incur any debt and the government must remain on a pay-as-you-go basis. This relieves citizens and businesses from paying high interest on a state debt.

In discussing legislation passed by the 1957 Indiana General Assembly, Lieutenant Governor Parker came out forthright as a champion of the so-called "right-to-work" law which was passed by this year's legislature. The lieutenant governor is a former member of the Indiana Public Service Commission and is fully acquainted with the problems and needs of public utilities.

The convention re-elected the following directors: John Goodwin of Brookville; Harry S. Hanna of Indianapolis; J. A. Harbaugh of Sullivan; R. R. Hirschman of Indianapolis and Francis Simpson of Winchester.

Other directors are: Frank E. Bohn of Fort Wayne; R. F. Lucier of Warsaw; C. E. McCormick of Terre Haute; R. D. Pontius of Rochester; S. K. Trip-

pet of Princeton; R. V. Achatz of Aurora; C. D. Ehinger of Decatur; L. H. Meyer of Fort Wayne; W. J. Scheidler of Greensburg, and LaMar S. Stoops of Nappanee.

The directors elected the following officers: President, Mr. Simpson; first vice president, Mr. Ehinger; second vice president, Mr. Meyer, and secretary-treasurer, George A. Schumacher.

Traffic and Commercial Conference

By MAYME WORKMAN

TELEPHONY's Traffic Editor

MORE THAN 100 women, and a few men, attended the complimentary Ladies' Breakfast on May 9, preceding the Traffic and Commercial Conference held during the Indiana convention.

Virginia Williamson of Portland, chief operator, United Telephone Co. of Indiana, Inc., was conference chairman. She introduced the following chairmen of the association's district traffic committees: District 1, Margaret Byrne of Princeton; District 2, Ada Hodson of Bainbridge; District 3, Hazel Gillespie of Monticello, and District 4, Myrtle Chew of Knightstown. Miss Williamson is chairman of District 5.

The chairman then called upon LaMar Stoops, second vice president of the Indiana Telephone Association, and vice president, Nappanee Telephone Co., to welcome those in attendance at the meeting.

The chairman then introduced A. Logan Steele of Indianapolis, connecting company relations department, Indiana Bell Telephone Co., who presented an interesting and enlightening talk on "The 2-5 Numbering Plan," which will be published in TELEPHONY in an early issue.

This writer was scheduled to extend "Greetings" but it was not known that the greetings were to be in the form of a tribute to Miss Marie Jellison, traffic representative, United Telephone Co. of Indiana, Inc., and the Ohio Service Co. of Ohio, who will soon retire after more than 40 years' service in the telephone industry.

Because a number of Miss Jellison's co-workers requested a copy of the tribute to her, it is being published in its entirety, as follows:

"It has been my privilege to enjoy many pleasant tasks during my years of service in the telephone industry, and this is one of the most pleasing of all—to pay tribute to your good friend, and mine, Marie Jellison, on the eve of her retirement from the telephone industry.

"Miss Jellison was first employed in the industry in the summer of 1910 at Portland, Ind., as an operator for the locally-owned telephone company. Two years later, she was appointed chief operator in this exchange. Shortly thereafter, she also assumed the position of cashier. The locally-owned company was purchased by the United company in 1933 and Marie continued to serve as cashier-chief operator until 1934, when she started traveling as a commercial representative for the United company. A year later, Marie returned to her first love—the traffic department.

"In her position as traffic representative, Miss Jellison visited all of the 92 exchanges of the United Telephone Co. of Indiana, the Jasper Telephone Co., and the Ohio Service Co.

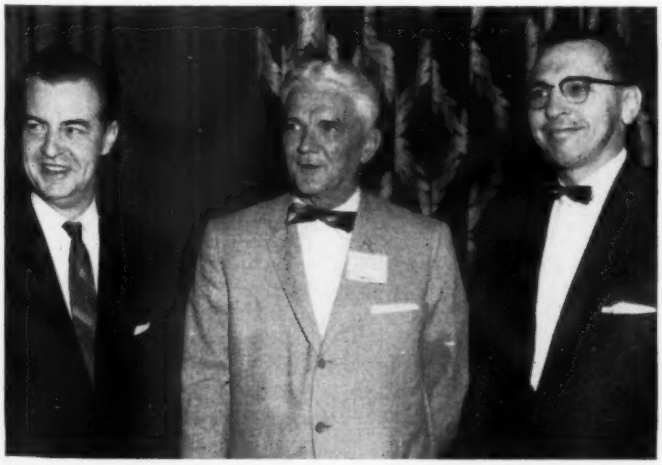
"As a former traffic supervisor, may I say this was a big order! Since the grass always looks greener on the other side of the fence, no doubt many operators, supervisors, and chief operators have longed to change places with Marie. To them, the job appears fascinating—traveling about the country, meeting people, entertaining and being entertained—all of which is true. But there is another side—driving under stress in all kinds of weather, being friendly and affable when you are not feeling up to par, staying up late, when a good book and your hotel room are so appealing. Yes, there *is* a glamorous side but, as the old saying goes, there are always two sides—and Marie has experienced them both.

"A traffic supervisor never knows how many lives she has influenced in her contacts in the exchanges in which she has worked and, Marie being the person she is, unquestionably has many good marks chalked up to her credit in the years she has worked in her company's exchanges. A traffic supervisor is often a confidante, as well as an instructress. Girls confide in her and seek her help in personal problems as well as problems relating to the job.

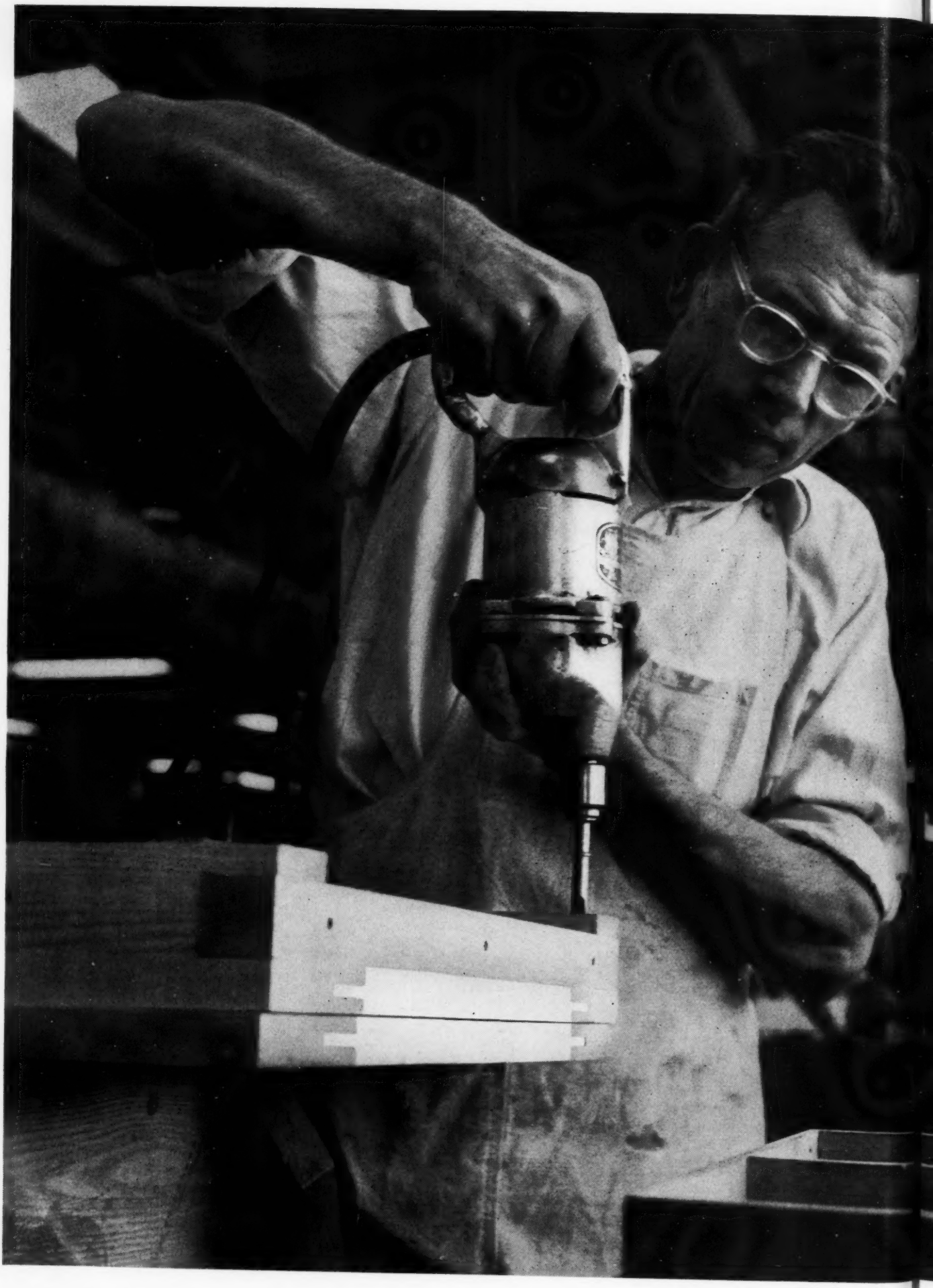
"If we were to ask Marie, 'Would you choose telephony as your vocation if you were making a choice today?' I'm confident she would give an affirmative answer, without hesitation.

"Our good friend, Marie Jellison, plans to retire on Sept. 1. We shall all regret to see her leave. But telephone folk don't actually retire. Like a general, they just silently fold their tent and steal away. Marie's memory will

(Please turn to page 54)



LEFT PHOTO, Left to right: James H. Shultz, general manager, Richmond Home Telephone Co., 1957 Indiana convention chairman; Lt. Gov. Crawford F. Parker, convention speaker; C. D. Ehinger, president, Citizens Telephone Co., Decatur, and first vice president of the Indiana Association. RIGHT PHOTO: Attending Pioneer social hour during the Indiana convention were, left to right: William Klingler Jr. of Brazil, manager, Citizens Telephone Co. of Clay County, Inc.; Mrs. Mayme Workman of Springfield, Ill., executive secretary, Independent Telephone Pioneer Association; E. C. Mull, manager, Knightstown Telephone Co.



PORTRAIT OF AN INDUSTRY

The Cabinetmaker

To a world of wire, cable and switching equipment he brings his tools—and a way with wood. The fine switchboard cabinets and telephone booths he builds are his contribution to our job of providing good telephone equipment for the Bell telephone companies.

Like the lineman and the operator, the cabinetmaker lends his special skill and talents to help achieve the common goal of the telephone industry . . . providing better telephone service for America.

Western Electric

MANUFACTURING AND SUPPLY UNIT OF THE BELL SYSTEM

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

CONSIDERABLE discussion is underway at the present time with reference to direct dialing to and from PBX extensions. This is not anything new to this writer as we have advocated the adoption of this practice for many years. We have never been able to understand why an automatic PBX operator should complete an incoming call manually to an extension.

On most large PBX systems, the party on an incoming call will know the extension number and if not it must be obtained from information. It appears ridiculous to complete such calls manually when the subscriber can dial the extension direct and save both time and money.

We realize that certain PBX systems cannot be converted to full automatic operation immediately. Some business concerns, such as hotels, will require an operator to handle at least a part of the incoming calls at least until special equipment can be developed.

Furthermore, we believe that during the next few years many small PBX systems will be eliminated as unnecessary. We seriously doubt that many of these small systems can be properly justified at the present time.

In this we do not refer to small key type telephone systems where several extensions have access to two or more main lines and where the service of an operator is not required.

Why do we need small PBX systems anyway? Probably the best answer is to adequately serve a group of customers, with a common interest, when they are located a considerable distance from the central office.

For example, 50 telephones are served by 10 trunks and a considerable saving in cable plant is realized. Moreover, inter-communication service may be had between the 50 extensions. This service is made possible at the cost of an operator who must remain on duty during office hours. Usually a few telephones are connected to the trunks at night to provide necessary or emergency service without the need of an operator.

We believe that the pole-mounted concentrator now coming into popular use can provide this same service at a considerable lower cost.

This prediction is based on the following assumptions: If it were necessary for everyone to talk at one time on a 50-line PBX, 25 cord circuits would be required. Actually, the average subscriber requires the use of his telephone only from 5 to 10 per cent of the time during periods of heavy traffic. The majority of our switching systems are designed to handle conversations on only 10 to 20 per cent of the lines at one time.

Pole-mounted concentrators can handle service from about 50 subscribers over 10 trunk lines under average traffic conditions and provide comparable service to individual line or PBX. This arrangement will permit considerable savings in cable plant and in the case of a small PBX eliminate the need of an operator.

With this arrangement, however, intercommunication service through the main exchange might not prove entirely desirable in all cases.

In special cases, one of the numerous available intercommunications systems, either dial or key type, could probably be used to advantage.

Transistors, printed circuitry and miniaturization of electronic equipment contribute much to the design of the new pole-mounted concentrators. Plug-in equipment components reduce maintenance difficulties and costs.

Improved storage batteries and charging equipment make the powering of these units a comparatively simple task.

A large number of these new concentrators are currently in service and no doubt their use will increase considerably during the next few years.

To sum up, we believe that this new concept of direct dialing to and from PBX extensions and the replacement of certain small PBX systems by concentrators should contribute much toward the improvement and reduction in cost of PBX service.

During the recent 10th annual conference of the Industrial Communication Association at Atlantic City, N. J., C. L. Hutchison, communications engineer of E. I. du Pont de Nemours & Co., Wilmington, Del., pointed out that until recently, the PBX had been largely neglected in the general development of the telephone system. We agree but contend that something is due to be done about it in the very-near future.

•

Numerous operating companies are now taking advantage of open house night to familiarize customers with new services available. Displays are arranged of colored telephones, hands-free telephones, answering devices, pushbutton telephones, kitchen telephones, illuminated dials, etc.

This is certainly good advertising and should react to the advantage of any telephone company.

•

We recently read an account of a visit to the new Alffer Hotel in Mexico City. It is claimed that United States builders could take lessons from this ultra-modern 3-million-dollar 10-story structure.

Even the telephones are of the latest design, a light-weight plastic one-piece instrument with a dial on the bottom.

•

It has been said that daylight saving time is just about all you can save nowadays.

XUM

Yes sir, Penta-treated poles sure are clean and easy to handle

Chuck stood looking at the new pole for a minute, then he took a swipe at it with his hand and held it up for me to see. Told him I didn't see anything, but he replied that was just the point. Said these were the cleanest poles and crossarms he'd ever worked with.

I told Chuck that's because they're treated with Penta, and that Penta-treated wood is clean and easy to handle. Penta keeps rot and termites out, too—makes poles and arms last years longer. That means fewer replacements later on and makes things easier for Chuck and me all the way around.

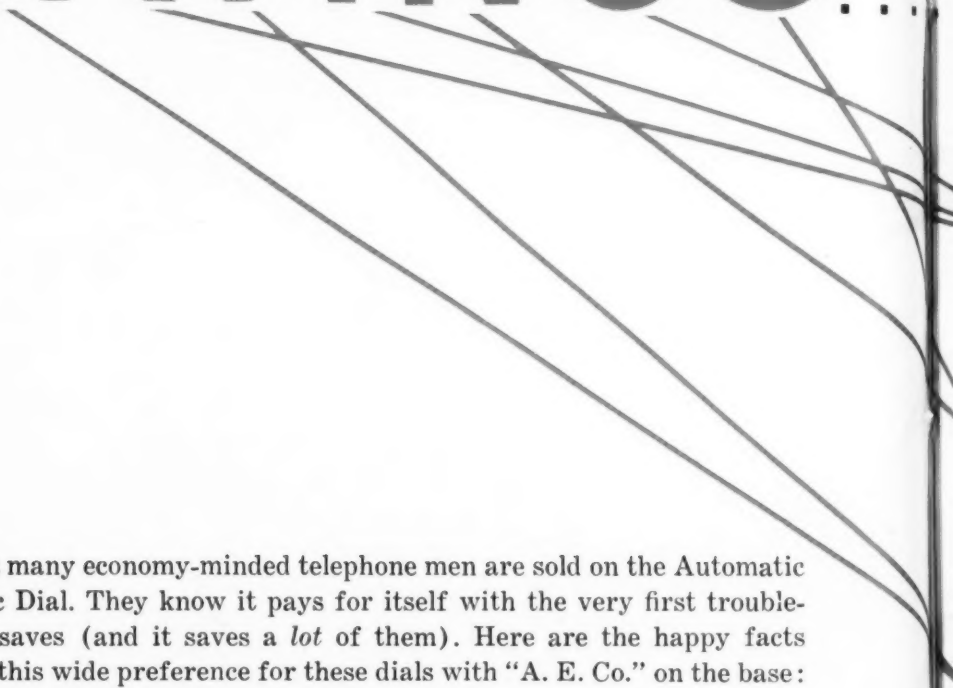
Chuck said he hoped we'd be using Penta-treated poles and arms from now on. I said we most likely will because they don't cost any more than poles and arms treated with ordinary preservatives.

THE DOW CHEMICAL COMPANY, Midland, Michigan, Department PE 501E-1.

YOU CAN DEPEND ON DOW

Automatic's Dials spell

SAVINGS...



A great many economy-minded telephone men are sold on the Automatic Electric Dial. They know it pays for itself with the very first trouble-trip it saves (and it saves a *lot* of them). Here are the happy facts behind this wide preference for these dials with "A. E. Co." on the base:

- Mirror-finish working parts, precision-cut gears, special lubricants, keep down wear.
- Twin contacts for greater dependability.
- Plastic dust cover provided when used in Types 80 and 90 Telephones.
- Improved governor design for longer life.
- Arrowheads guide subscriber's eye from numbers to finger holes.

Specify AK-90 for metropolitan dials, AK-80 for 1-0 dials—they fit all makes of telephones. Better yet, order Types 80 and 90 Telephones, and get *all* their unequalled advantages, including Automatic's famous Dials! Address: *Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7. Or call HAymarket 1-4300.*

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One of America's great communications systems

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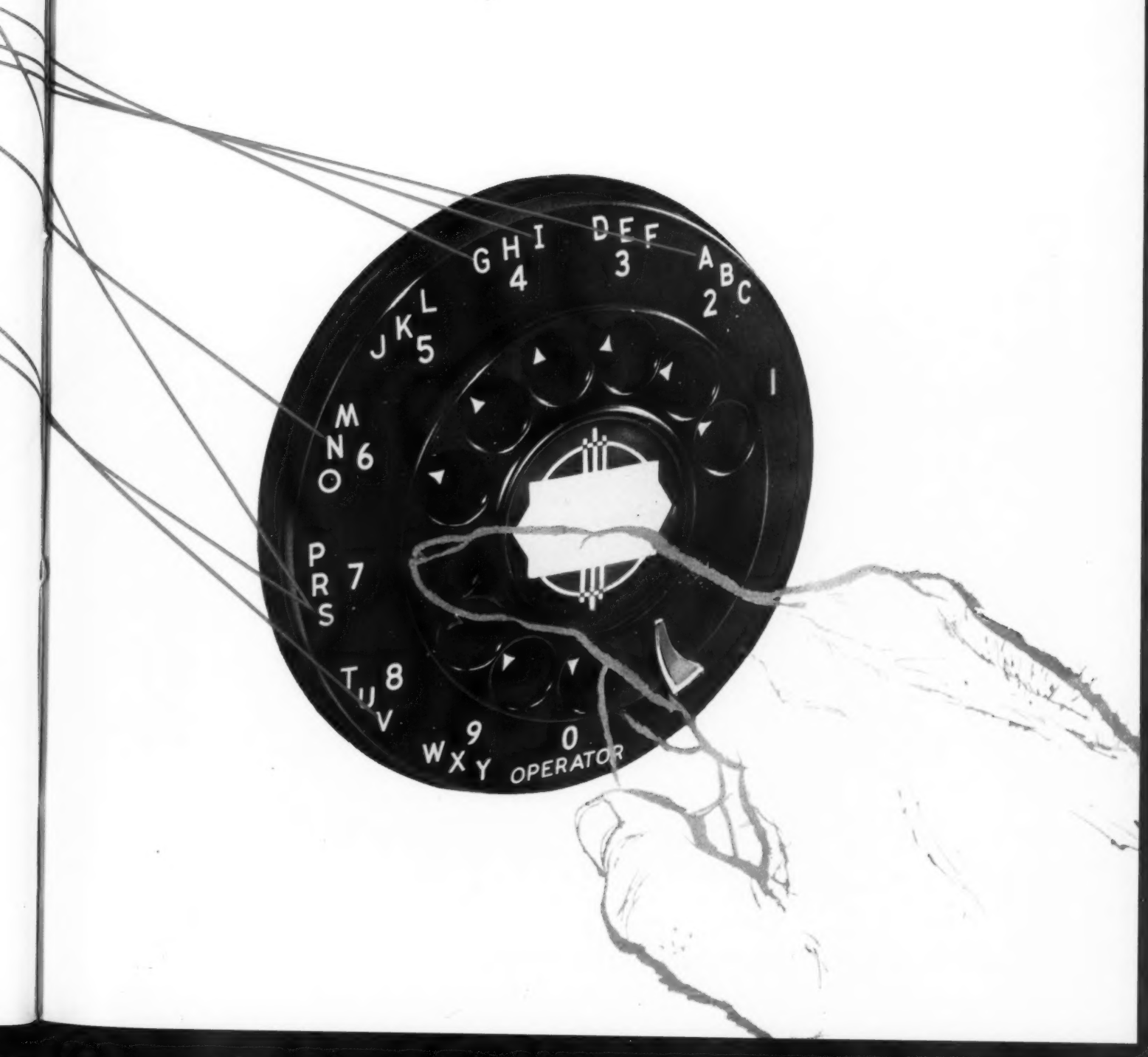

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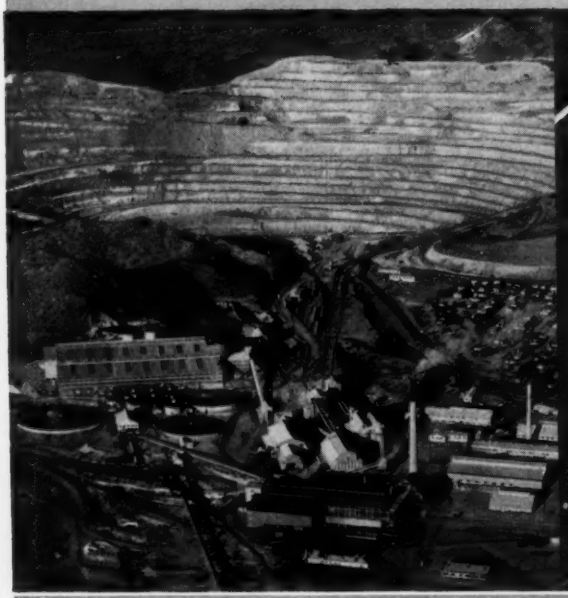
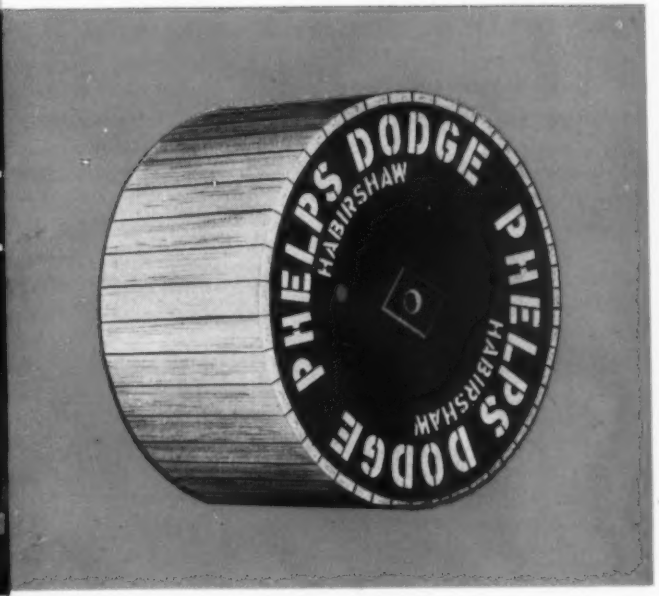


- Highest grade copper from Phelps Dodge's own open-pit mines.
- Finest insulating materials for long-life service assured by exhaustive laboratory and field tests.
- Careful control of quality throughout fabrication to meet the most exacting specifications.
- Years of manufacturing experience in the communications field.
- Complete line of paper and plastic insulated telephone wire and cable to serve your needs.



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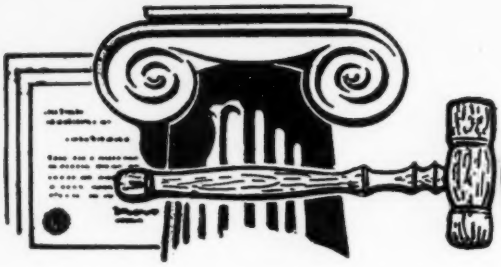


Courts and Commissions

Two Tennessee Companies Ask Long Distance Raises

A request for an increase in intrastate long-distance rates for two telephone companies was taken under study on May 14 by the Tennessee Public Service Commission.

Southern Continental Telephone Co., Cookeville, and Intermountain Telephone Co., Bristol, asked for toll rate increases comparable to those granted to Southern Bell Telephone & Telegraph Co. under a recent order of the state supreme court (TELEPHONY, May 25 p. 41). Southern Bell's rate increase was put into effect under bond, pending a hearing before the supreme court.

NW Bell Granted Rate Increase in Nebraska

The Northwestern Bell Telephone Co. on May 31 was given permission by the Nebraska Railway Commission to revise its rates and charges for service in Nebraska to produce $1,294,006 additional annual revenue (TELEPHONY, Jan. 26, p. 35). The company had asked for $2,148,000.

This will produce additional net intrastate earnings of $600,067 which the commission's order states will permit the company to pay reasonable dividends, meet its debt charges, attract additional capital and provide for additions and betterments to its intrastate plant and equipment.

The rate of return under the new order is estimated to be 6.2 per cent on a rate base of $49,087,031. This is based on the book cost of the company's intrastate plant and equipment plus materials and supplies and working capital, less depreciation reserve.

The commission asked the company to submit a schedule of rates which will produce the allowed additional revenue.

The company's application stated that annual wages had increased $1,595,169 as a result of wage increases from 1953 to 1956. Another major increase in costs resulted from the attrition of earnings resulting from making replacements of and additions to plant at current high cost levels without developing an increase in revenue proportionate to the increase in plant investment. Increased compensation to connecting companies for joint toll business and the increase in the cost of capital were other factors cited.

W. Va. Commission Appoves Ownership Transfer

The West Virginia Public Service Commission on June 1 announced authorization for Rural Telephone Co., Inc., to operate the former facilities of the now-defunct Pritchard Telephone Co.

Pritchard served Pennsboro and other areas in Ritchie, Doddridge and Gilmer counties. The system once served about 1,000 telephone customers but is now down to 163 subscribers.

The commission order authorized a scale of rates to be put into effect by Rural Telephone. Sample monthly rates: $3.50 for single-party residence service; $2.75 for residence service, two-party or more, and $2.50 for rural residence service.

Pritchard's facilities were sold in 1955 under a decree of Ritchie County Circuit Court. The successful bidder, Isadore Tucker, in turn sold the system to Rural Telephone.

Wisconsin Companies Ask to Sell, Increase Rates

The Wisconsin Public Service Commission on June 12 was scheduled to hear the application of the Polar Telephone Co., Langlade, to sell its plant to General Telephone Co. of Wisconsin.

The commission on June 13 was to hear the petition of the Manitowish Waters Telephone Co. for authority to increase rates.

Ohio Rate Raise Approved

The United Telephone Co., Bellefontaine, on May 29 was authorized by the Ohio Public Utilities Commission to effect an over-all rate increase approximating 54 per cent, it was reported (TELEPHONY, Mar. 16, p. 54). The application was filed on July 5, 1955.

Illinois Commission OKs Four Financing Plans

The Illinois Commerce Commission recently authorized the following four financing plans:

DeKalb-Ogle Telephone Co., Sycamore, 22,025 shares of common stock, $10 par; purpose: reimbursement of money expended from income, for construction, extension or improvement of facilities.

Kaskaskia Valley Telephone Co., Patoka, 500 shares of common stock, $10 par, and 238 shares 5 per cent cumulative preferred stock, $50 par; purpose: to acquire plant and equipment of Keyesport Telephone Corp.

Looking Glass Prairie Telephone Co., Mascoutah, an unsecured promissory note for $265,000, payable to Phoenix Mutual Life Insurance Co., dated Jan. 1, 1957, due Jan. 1, 1977. Purpose: discharge or lawful refunding of obligations; acquisition of property, or for construction, extension, etc., of facilities.

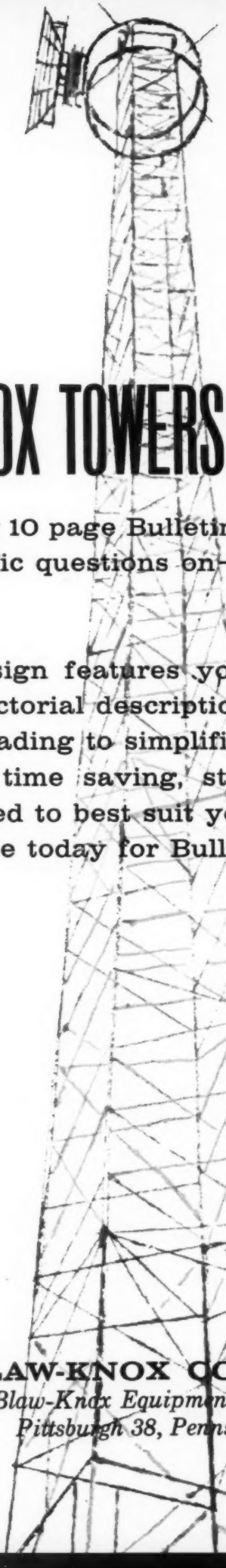
Mulberry Telephone Co., Mulberry Grove, 30 shares 5 per cent cumulative preferred stock, $100 par, and a $30,000 note due to Stromberg-Carlson Co., and payable in 240 consecutive monthly installments; purpose: to purchase all capital stock and property of Vandalia & Southwestern Telephone Co. and convert it to automatic operation (TELEPHONY, May 25, p. 41).

Maine Rate Base Bill Passes

A bill removing "current value," or reproduction cost, as one of the factors the Maine Public Utilities Commission must consider in evaluating the properties of public utilities for rate-making purposes was given final passage by the Maine Legislature May 29 and sent to the governor for signature (also see *In the Nation's Capital*, this issue).

Seeks Dial Rate OK in Mo.

Cassville Rural Telephone Co., Inc. on June 6 applied to the Missouri Public Service Commission for authority to file rates for dial service at its Cassville and Washburn exchanges.



NEW!

BLAW-KNOX TOWERS FOR MICROWAVE SYSTEMS

Here is a new 10 page Bulletin prepared especially to provide answers to your specific questions on—

"What type tower do I need?"
"How much will it cost?"

Describes design features you should look for in selecting a tower.

Contains pictorial description of best tower fabrication methods and procedures leading to simplified erection.

Gives you time saving, step-by-step procedure for obtaining the tower designed to best suit your specific requirements.

Call or write today for Bulletin 2538.

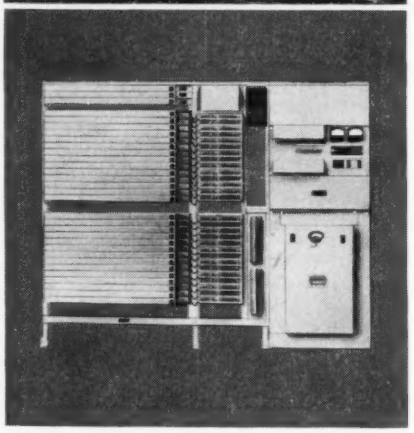
BLAW-KNOX

BLAW-KNOX COMPANY
Blaw-Knox Equipment Division
Pittsburgh 38, Pennsylvania

MICROWAVE TOWERS

Blaw-Knox designs, engineers and fabricates guyed and self-supporting type Microwave Towers and ... Transmission Towers ... Guyed and self-supporting Antenna Towers for AM, FM, TV, Radar ... Parabolic Antennas for tropospheric scatter propagation ... Structures custom built to support special equipment

F-40 equipment cabinet easily rolls anywhere in office. Furnished in harmonious office gray, it is only 6′ 4″ high, 4′ 1″ wide, 2′ deep.



F-80 PBX is 6′ high, 7′ wide, 1′ deep. It is wired for night answering service; offers single party, restricted and "executive-right-of-way" service; provides conference and code call facilities. It has a capacity of 14 talking paths, 10 central office and 4 information trunks, and up to 80 lines.

"Our c

c

"A

W. R. Schaffner, left, secretary of The Sexauer Company of Brookings, S. D., watches Mayor Homer Dwiggins place a call on the company's new Stromberg-Carlson F-40 Dial PBX. In front of the Mayor is the cordless attendant's cabinet—about the size of a modern adding machine.

XUM

ir commercial customers are delighted," *said exchange manager*

"A joy to operate," *said user*

They're talking about the XY® F-40 Dial PBX.

Mr. Charles O'Neill, Manager of the Brookings (South Dakota) Municipal Telephone Exchange, recently installed an F-40 at The Sexauer Company, a local grain and feed firm. Mr. O'Neill reported that the customer is delighted with the efficient dial service provided by this compact PBX.

"The turret is a joy to operate," said Mrs. Marles Kangas, operator-receptionist at The Sexauer Company. "I'm amazed at the extra time it allows me for my other duties. Takes up so little space, too."

You'll find the F-40, with its capacity of 10 trunks, is the ideal answer to dial PBX service for medium-sized commercial offices. It provides manual intercept on incoming trunk calls; extension, hold and transfer facilities for up to 40 stations.

The Stromberg-Carlson F-80 Dial PBX (capacity up to 80 lines, 14 talking paths, 10 central office and 4 information trunks) is the F-40's larger companion. It is "tailored" for factories, large offices, schools, hospitals and other business and institutional subscribers.

For complete technical data and selling aids on both dial PBX's, call or write the Stromberg-Carlson sales office in your area.

S-C STROMBERG-CARLSON

A DIVISION OF GENERAL DYNAMICS CORPORATION

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GD GENERAL DYNAMICS

XUM

Kan. Commission Authorizes Two Companies to Acquire

The Kansas Corporation Commission on May 29 authorized Lewis Telephone Co. to take over the nearby Garfield Telephone Co., whose lines were badly damaged by the March blizzard.

Commission Chief Engineer Lloyd Shank said the Lewis company already has awarded a contract for rebuilding the lines and converting service to dial. The company was authorized to borrow $128,000 to do the work.

The commission also told Southwestern Bell Telephone Co. it could take over three small exchanges, all of which will be converted to dial service. They are at Mulvane, Lone Star and Clinton. The latter two will be connected with the exchange at Lawrence when the conversion is completed.

Alabama Company Given OK For Purchase, Financing

The Alabama Public Service Commission on May 24 granted authority to the Elmore-Coosa Telephone Co. to purchase the Camp Hill Telephone System.

The commission also authorized the company to issue and sell common capital stock in the amount of $8300 and to borrow $159,000 through the Rural Electrification Administration.

The company also plans to pay off an outstanding loan of $5,040 and will increase its capital stock from $25,000 to $33,300, it was reported.

REA Changes Interest and Principal Payment Methods

A change in the method of applying payments on REA electric and telephone loans made on and after June 5 has been announced in the bulletin given in full below.

Provisions of the bulletin are not retroactive. Terms of interest and principal payments on notes issued or to be issued under loan contracts dated prior to this bulletin are not affected.

The change does not affect the 2 per cent interest rate fixed by the Rural Electrification Act.

Interest Payments: The bulletin provides that interest shall be payable on a quarterly basis as it accrues. This brings the method of collecting interest on future REA loans into line with general practice—in and out of Government — of applying payments on loans. Under this practice, known as the United States Rule, all interest is paid before any payments are applied to the principal of a loan.

In the past, payment of interest was postponed during the early period of the loan. Accrued interest during that period was paid in installments over the remaining life of the loan.

The bulletin also provides, when so requested by the borrower and found necessary, that a loan may include funds from which payments of interest may be made during the period preceding the first scheduled payment of principal.

Loan funds may be used for such interest payments during construction and development for a period not to exceed five years.

Principal Payments: The bulletin further provides that principal payments generally will be scheduled to begin three years after the date of a note but may begin at a later date if there is a demonstrated need.

In the past, principal payments on electric loans generally have been scheduled to begin five years after the date of the note and on telephone loans three years after the date of the note.

In those cases where need for a longer period is established, the specific period will be determined by the circumstances in the particular case. It is not anticipated that all borrowers will need a special scheduling of principal payments.

The revised policy provides necessary flexiblity in scheduling principal payments of those borrowers that may face:

(1) Unusual requirements arising out of the pyramiding of loan payments on a series of separate notes; or

(2) Heavy immediate investments in facilities required to provide adequate service at the lowest average annual cost with the return being realized through long-term growth.

Full text of the REA bulletin, signed by the administrator, follows:

REA BULLETIN 20- 7 (Electric)
REA BULLETIN 320-10 (Telephone)
SUBJECT: Interest and Principal Payments on REA Loans under Sections 4 and 201 of the Rural Electrification Act

I. *Purpose:* To set forth policy on terms of payment of interest and repayment of principal on loans made hereafter under Sections 4 and 201 of the Rural Electrification Act. This policy does not apply to payments of interest and principal on notes executed or to be executed under loans approved before effective date of this bulletin.

II. *Policy:*

(A) *Payment of Interest:* Interest shall be due and payable quarterly as it accrues.

(B) *Interest Payments from Loan Funds:* A loan may include funds for payment of interest during the period preceding the first scheduled principal payment or for a period not exceeding five years, whichever is the shorter, if requested by the borrower and found necessary.

(C) *Principal Payments:* Repayment of principal generally will begin three years from the date of a note, but may begin at a later date if there is a demonstrated need. Notes providing funds for refinancing or acquisition of facilties already in revenue-producing status generally will require that principal payments begin within a year from the date of the note.

III. *Effective Date:* The provisions of this bulletin are effective immediately and will be applied wherever practicable to loans now in process.

This bulletin supersedes all other material in conflict with its provisions.

USITA Adopts Theme For 60th Anniversary

"Independent telephony — a vibrant voice in an expanding economy," is the theme which has been adopted for the United States Independent Telephone Association's 60th anniversary celebration and for its October convention, the USITA announced in its member letter dated June 5.

Both the anniversary observance and the convention will highlight USITA's contributions to the telephone industry and the communications art during its six decades of service to Independent telephony.

The USITA reports the anniversary celebration is gaining momentum in various sectors. The first proclamation to be issued by a state governor has been issued by Governor Theodore R. McKeldin of Maryland.

The proclamation, designating Sept. 8-14 as Independent Telephone Week in the Free State, is a handsome, imposing document bearing a gold seal and blue ribbon, and reads as follows:

"Since its inception 60 years ago, the United States Independent Telephone Association's services have soared—today benefiting more than 9 million phone-owners.

"Independent telephone companies now provide phone services to nearly 11,000 cities and towns throughout the country. These companies and their manufacturers are responsible for many significant technological developments in the art of telephony.

"Among these are the dial telephone, selective ringing, subscriber toll dialing and automatic toll ticketing.

"Together with their manufacturers and suppliers and related firms, Independent telephone companies are a vital part of the American free enterprise

(Please turn to page 47)

New bulletin to give you

THE FACTS ON NEW COPPERPLY® WIRE

Bulletin 202 contains helpful engineering data and general information on the features, characteristics and use-advantages of unique Copperply wire.

And Copperply *is* unique with its electroplated copper coating, precise concentricity, and weld-free lengths. It is available in a broad range of sizes, coating weights and steel core analyses . . . and on reels up to 600 pounds for insulating, or in standard coils for field construction.

So write National-Standard, Niles, Michigan for your copy of Bulletin 202. It gives the facts you should have at hand.

NATIONAL STANDARD

DIVISIONS: NATIONAL - STANDARD, Niles, Mich.; *tire wire, stainless, music spring and plated wires* • **WORCESTER WIRE WORKS, Worcester, Mass.;** *high and low carbon specialty wires* • **WAGNER LITHO MACHINERY, Secaucus, N. J.;** *metal decorating equipment* • **ATHENIA STEEL, Clifton, N. J.;** *flat, high carbon spring steels* • **REYNOLDS WIRE, Dixon, Ill.;** *industrial wire cloth.*

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National-Standard Company, Niles, Michigan:
Please send me a copy of Copperply Bulletin 202

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Company_____

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construction and maintenance DIGEST

- **Most for least**
- **Lead in reserve**
- **Look—no tools!**
- **Profitable noise**
- **Underground winner**

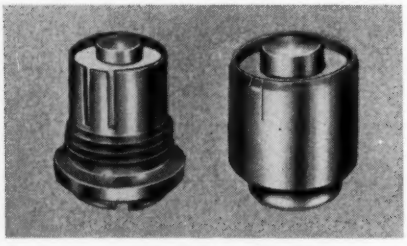
Published regularly to help you get the most out of your materials and supplies dollar

by John W. Garbutt, Inside Sales—Rochester

As a volunteer fireman I have to be alert at all times, just as Stromberg-Carlson is always alert to meet your supply needs. We're "on the job" for you 24 hours a day—because telephony is our full-time job, not just a sideline. Every order we fill for you brings you fine products, protected by a double guarantee—ours, and the maker's. And the attention given to your order is as careful as if our total program depended on it—because it does! Your supply business makes possible the research program that discovers new and better telephone equipment—to serve you. It's a pleasure to be working with you—we sincerely appreciate your support!

Arrester gives maximum protection

With the Cook Mytigap Arrester you get the utmost in cable terminal and substation protection at low cost.



Mytigap Arresters.

Cook Electric Company's Mytigap is a lightning arrester and power-cross protector in one, featuring self-restoring operation after functioning. It is available in 2 styles: a snap-in type to fit Cook terminals and a type that is made with special screw-type housing for general applications.

Mytigap Arresters require minimum attention or service. Internal parts are readily accessible for easy field replacement if damaged by extreme disturbance.

This arrester represents the most advanced high-potential dischargers for line and cable protection.

Reserve lead keeps battery young

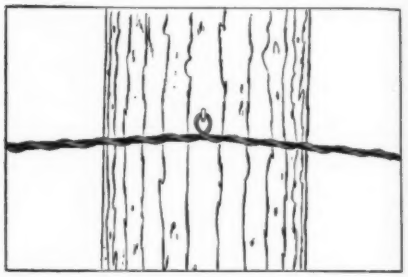
Inside the unique lead buttons in an Exide-Manchex positive plate there's a coil of reserve lead designed to prolong battery life. Over the years, as this lead is needed, it goes into action, instantly and automatically.

The unique thing about Exide-Manchex construction is that the reserve lead does not have to support the plate. The spiral lead buttons are tightly locked into a cast lead-antimony alloy grid several times more rigid than pure lead. Hence the reserve lead can be completely consumed while the plate retains its strength.

Only Exide-Manchex Batteries have this construction. In addition, they feature a plastic jar that saves weight and space, high level electrolyte for less frequent filling, and huge bottom reservoir that virtually insures against sediment shorts.

Apply these tangent supports by hand

You can make mid-span supports simply, efficiently and at low cost with Preformed Tangent Supports.



Made of stainless steel, with neoprene coating for protection against corrosion and abrasion.

You need no tools to apply these supports. The job is easily done by hand. To install, simply place loop configuration on the wire and then wrap on the legs.

You eliminate cross-talk by giving line wire 10 longitudinal twists, alternating at every other pole.

Your Stromberg-Carlson representative is ready to supply them to you.

Noise can be money!

Take a business subscriber who has a telephone in some extremely noisy location—and who has finally decided to do something about it.

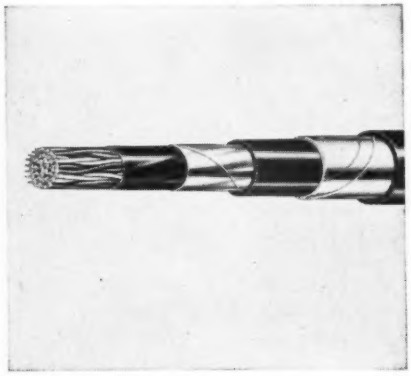
Would you rather have him spend money in building a soundproofed booth—or give **you** the money as monthly income on a telephone which completely licks the noise problem?

The GAI-PHONE is such an instrument. It has a special transmitter that actually creates a "Zone of Quiet" around the handset—even in a spot as noisy as a boiler factory! It costs the subscriber **less** than a booth—and you get the revenue!

Ask us for complete details.

Cable that can take it

This Ansonia Wire & Cable Company product offers finer electrical characteristics than any other comparable cable.



Available in 24, 22 and 19 gauge, 11 through 404 pair

If you want direct burial cable that stands up under severe ground conditions, order Ansonia Type 775-AP Cable.

Its individually insulated conductors are paired and cabled with a covering of aluminum tape, a plasticized jacket, plus a butt-lapped, stagger-jointed, flat armor tape and a second overall jacket of plasticized polyvinyl chloride.

When you need cable that gives maximum protection, specify Ansonia Type 775-AP Cable.

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system and the economic and social well-being of the United States.

"Therefore, I, Theodore R. McKeldin, Governor, do hereby proclaim September 8-14, 1957, as INDEPENDENT TELEPHONE WEEK in Maryland, and I urge that proper tribute be paid during this 60th anniversary celebration to the loyal men and women of the great independent telephone industry."

General of SE Gains Two Rate Increases in Texas

The following rate increases became effective in exchanges of General Telephone Co. of the Southwest in Texas during May 1957:

	Old	*New*
Roaring Springs		
Dial, 111 stations		
One-party business	$7.00	$ 9.00
Two-party business	5.50	7.50
One-party residence	4.00	5.00
Two-party residence	3.50	4.25
Wilson		
Dial, 112 stations		
One-party business	5.00	10.00
Two-party business	4.00	8.50
One-party residence	3.00	5.50
Two-party residence	2.50	10.00

Britain Gets First Ship-to-Shore System

Telephone calls from a launch in the Firth of Clyde to a tender in New York Harbor, and to the Assistant Postmaster General, Kenneth Thompson, M.P., in Liverpool, have just inaugurated the VHF Public Correspondence Channel on the Clyde—the first of its kind to be set up in Britain.

This system, which will enable ships in the Firth of Clyde to be connected with the public telephone system, will put shipping "on the telephone" to subscribers ashore at a very economical rate.

It will enable them to be in direct contact with harbour masters and dock superintendents, and vice-versa (with a remarkable saving in time). Clyde shipbuilders conducting trials will be able to save hours—and even days—in evaluating results.

The shore station is installed in the south of the Isle of Bute, and will be the first station of its kind to operate in line with communications agreements recently agreed at the International Maritime Conference at The Hague. The installation is based on the frequency modulated version of the Pye Telecommunications "Ranger" series of mobile radio-telephone—the most modern and widely approved radio units in the world—and employs 100-watt transmitters.

Showdown on Socialism

"[It is time for a] showdown battle between those who would nationalize and socialize basic American institutions and those who would continue the American economic policies . . . which have worked so well."—RICHARD M. NIXON, *Vice President of the United States.*

Colonel Behn, IT&T Co-Founder, Dies

Col. Sosthenes Behn, 75, retired chairman of International Telephone & Telegraph Corp. and, with his elder brother, the late Hernand Behn, its founder in 1920, died on June 6 of a heart ailment in New York City.

Known throughout the world as the builder of a great public utility and industrial empire, he saw his creation grow from a modest telephone and telegraph operation company, with properties in Puerto Rico and Cuba, to a worldwide electronics manufacturing and telecommunication operating system doing a yearly business of more than half a billion dollars. His business career of almost 60 years came to a close with his retirement from the IT&T chairmanship on May 23, 1956. He was honorary chairman of the corporation from then until his death.

COL. SOSTHENES BEHN

Colonel Behn was born of a Danish father and French mother on Jan. 30, 1882, on the island of St. Thomas in the Virgin Islands.

He first came to the United States in 1898 to learn the banking business. In 1904, he formed the banking and brokerage firm of Behn Brothers in Puerto Rico with his brother, Hernand. The need for rapid information aroused his interest in electrical communication, and he began buying up small local telephone companies which, in 1914, he consolidated into the Porto Rico Telephone Co.

In 1916, Sosthenes Behn went to Cuba and acquired the Cuban Telephone

KLEIN

preferred by linemen
. . . electricians

When it comes to leather goods for linemen or electricians, the name Klein today stands for the highest in quality as it has since the first wires were strung.

In Klein-Kord, too, Klein offers to industry the first specially woven fabric for safety straps—a fabric designed to permit the use of a tongue-type buckle without the risk of slitting or ripping under severe strain.

Now in Nylon Klein-Kord safety straps Klein still leads with the newest in safety equipment specially designed for use by utilities wherever power or communication lines are strung.

Write for Free Tool Guide
A free copy of the new Klein Pocket Tool Guide will be sent to anyone interested on request.

Ask your supplier

Foreign distributor:
International Standard Electric Corp., N.Y.

Mathias KLEIN & Sons
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Co., subsequently becoming its president.

Commissioned a captain in the Signal Corps, Sosthenes Behn stopped over in New York City on his way overseas and came to an agreement with the American Telephone & Telegraph Co. to form at a later date the Cuban American Telephone Co., on the basis of joint and equal ownership, for the purpose of laying a submarine cable between Havana and Key West. This agreement was carried out in 1919.

On June 16, 1920, Sosthenes and Hernand Behn incorporated International Telephone & Telegraph Corp. in Maryland. IT&T assets at that time consisted of the Porto Rico Telephone Co., the Cuban Telephone Co., and a half-interest in the Cuban American Telephone & Telegraph Co.

Four years later, IT&T won the contract for the rehabilitation and operation of the Spanish national telephone network. As part of the contract, IT&T undertook to build equipment in Spain. IT&T then took the world for its market and undertook to develop, manufacture, and sell equipment as well as to install and operate it.

In 1925 Colonel Behn raised 30 million dollars from the J. P. Morgan Co. to buy International Western Electric Co. Re-named International Standard Electric Corp. (ISE), this addition to IT&T provided manufacturing subsidiaries and associates in Argentina, Australia, Belgium, China, England, France, Italy, Japan, and Norway as well as in Spain.

Meanwhile, Colonel Behn has been expanding IT&T in other directions. The South and Central American and Caribbean cable network of All America Cables, Inc., was acquired in 1927, and in 1928 The Mackay System—Postal Telegraph-Cable Co., The Commercial Cable Co., Federal Telegraph Co., and an interest in The Commercial Pacific Cable Co.

Between 1925 and 1932, IT&T also acquired additional manufacturing subsidiaries and associates in Austria, Czechoslovakia, Denmark, France, Gernany, Hungary, Jugoslavia, the Netherlands, Poland, Portugal, and the United States, as well as new telephone and radio operating properties in Argentina, Brazil, Chile, China, Mexico, Peru, Rumania, and Uruguay.

The first decade of expansion was followed by nearly two decades of trial, as the depression of the 30's, civil wars in China and Spain, World War II, and finally, the Cold War tested the stability of the IT&T system. The death of Colonel Behn's brother, Hernand, in 1933 was yet another blow to Colonel Behn, who added Hernand's presidency to his own chairmanship of the corporation.

Plagued by destruction and confiscation of property, restriction of trade, devaluation of currencies, freezing of international exchange, and the spread of dictatorship, nationalism, war, and revolution, Colonel Behn not only kept IT&T afloat but brought it through the ordeal with its long-term debt practically liquidated and with extensive new research and manufacturing properties in the United States. His sale of IT&T's Rumanian and Argentine telephone networks for cash, and of its Spanish telephone network for cash and bonds, provided the means by which he saved the corporation and re-oriented it towards renewed expansion.

In 1948, he relinquished the presidency of IT&T in favor of William H. Harrison, formerly vice president in charge of operations and engineering at American Telephone & Telegraph Co., who was succeeded by Gen. Edmond H. Leavey on Mr. Harrison's death in April 1956. Colonel Behn retained the chairmanship of the corporation until his retirement in May 1956.

Colonel Behn served in World War I as executive officer to the chief signal officer, A.E.F., as commander of the 322nd Field Signal Battalion, and as assistant chief signal officer, First Army A.E.F. He saw action in the Chateau Thierry, St. Mihiel, and Argonne offensives, and received the Distinguished Service Medal from the United States and the Legion of Honor from France.

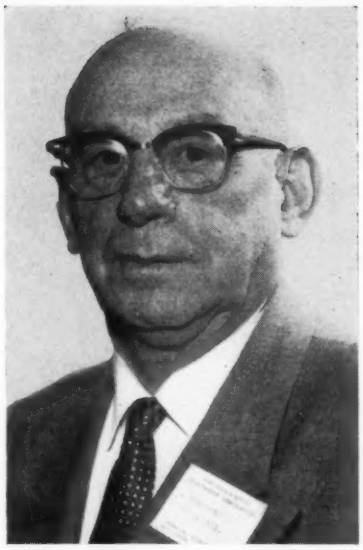
A director and president of Port of Havana Docks Co., and of Havana Docks Corp., Colonel Behn was also a director of L. M. Ericsson Telephone Co., Ltd., Sweden, and of the National City Bank of New York.

Colonel Behn is survived by his wife, the former Margaret Dunlap of Philadelphia; two sons, Edward and William; a daughter, Mrs. Eric Ertman, and five grandchildren.

Bowden Director of Wis. Association 30 Years

The 1957 convention of the Wisconsin State Telephone Association marked the end of a 30-year term on the association's board of directors for A. H. Bowden of Almond, Wis. He retired as a director this year leaving behind him one of the longest service records ever established by an Wisconsin association board member.

Mr. Bowden started his telephone career in 1908 as local manager of the Almond Telephone Co.; in 1917 he acquired control of the Union Telephone Co. serving Hancock and Plainfield, Wis.; in 1926 he acquired the controlling interest of the Coloma Tele-



A. H. BOWDEN

phone Co., and in 1929 he purchased the Bancroft Telephone Co. Today about 1,500 stations are connected to his properties.

Mr. Bowden will continue his activities in operating the properties, but he is turning a share of his duties over to his son, Dwight, who recently engineered the conversion of the Coloma exchange to automatic operation.

SB T&T Announces Staff, Administrative Changes

Southern Bell Telephone & Telegraph Co. on May 27 announced that W. K. Boardman Jr., now Louisiana vice president and general manager, will join the general headquarters staff in Atlanta as vice president, effective June 1.

He will be succeeded by H. G. Bartee, now vice president and general manager for Kentucky.

Southern Bell simultaneously announced election by the board of directors of two vice presidents—C. Hunter Green, of Louisville, Ky., to succeed Mr. Bartee, and Robert G. Elliott of Atlanta.

Southern Bell also announced the creation of separate operating staffs for its east and west administrative organizations, both with headquarters in Atlanta. Officials described the step as a further decentralization of executive management to keep pace with the South's rapidly expanding communications requirements. The appointments are effective June 1.

C. J. Tucker Jr., of Atlanta, general commercial supervisor, was appointed commercial operations engineer-west.

Clarence L. Lott, of Atlanta, commercial operations engineer, was appointed commercial operations engineer-east.

G. D. Henderson, formerly of Atlanta, now of New York with the

"Feel" the Silence

in a T-700 wall booth

The T-700 is accoustically so efficient the customer "feels" the silence and makes his call with assurance of privacy.

Requiring only 24" x 16" x 30" the T-700 saves space. It is durably constructed of scratch proof, wood grained, high pressure laminates bonded to heavy duty honey comb core. Interior is spray painted perforated hard board. Exterior finish available in either Frosted or Ribbon Walnut.

"Where's Your Phone?"

Everyone agrees directional signs increase revenue. Our new self adhering, hi-visibility, reversible arrow signs can be carried and put up by all your commercial representatives in only seconds—No holes to drill, just press on with normal hand pressure and the job is done—A real labor savings!

Write or call Geo. Phillips now.

Phillips—Brooks Atlanta Co.

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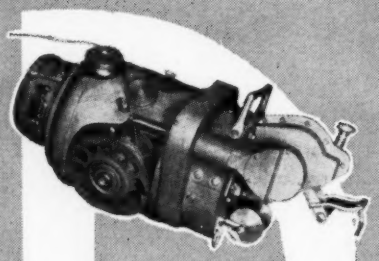
*Dependability



*The Neale Model "D" pull type spinner for over 12 years has been the work horse of the cable spinning field

- Spins new and existing cable
- Has instant adjustment from minimum to maximum cable sizes
- Positive lock, will not slack off
- Uses all sizes and types spinning wire
- Weighs only 42 pounds

THE MODEL "D" IS THE WORK HORSE IN THE CABLE SPINNING FIELD

PLEASE WRITE FOR LITERATURE

CABLE SPINNING EQUIPMENT CO.
3100 TOPEKA AVE.
TOPEKA KANSAS

Serving the growing Independent telephone industry

OVERSEAS SALES:
Ericsson Corp. of New York
Automatic Electric of Canada

American Telephone & Telegraph Co., was appointed traffic operations engineer-east.

D. A. Gammage, of Atlanta, traffic operations engineer, was appointed traffic operations engineer-west.

W. C. Bauer, of Atlanta, general merchandising supervisor, was appointed plant operations engineer-west.

C. B. Smith, of Atlanta, plant operations engineer, was appointed plant operations engineer-east.

Mr. Lott, Mr. Gammage and Mr. Smith already were operations engineers but in the future will be concerned with only one geographical area rather than company-wide matters.

Mr. Tucker's previous positions include Atlanta district manager, general directory manager, general sales manager and general commercial supervisor.

Mr. Henderson has spent most of his career at general headquarters, in the Atlanta district and other Georgia cities. He went to AT&T in 1956.

Mr. Bauer, prior to joining the merchandising department in 1956, filled plant department positions in Mississippi, Georgia and Tennessee.

CLEMSON SCHOOL

Continued from page 21

the Southern Bell school at Clemson in March were, by design, far from typical of those for whom the school was intended. The initial group, from each of the company's states, was made up of transmission and protection engineers and selected plant maintenance supervisors with long experience.

A particular reason lay back of the choice of these students. The first session of the theory phase was to be conducted as a "pilot" session, the students later to provide a critique of the course for the benefit of the steering committee and the college.

During the first term, the students and the Clemson professors held periodic meetings during which specific suggestions applying to each course were drawn up. The special nature of the training of this particular group of students was recognized by the professors; suggestions were sought and welcomed.

Toward the end of the third and final week of the first session, two members of the company's steering committee met with each of the professors serving in the pilot term. Suggestions related to each subject were reviewed, and proposed changes discussed. Most of the suggestions were minor in nature, but a revision was made both in topics and time allotted for one course.

New adapter shank bit
fits either hand brace or power drill

Taper square shank fits hand braces

Cut off taper and use "hex" shank in both power drills and hand braces

Cut your wood bit inventory by 50%

Now you can eliminate the need to stock two types of wood auger bits. Irwin's new Adapter Shank Bit fits both hand braces and power drills.

With hand braces, use the Adapter Shank Bit as it comes. Cut off taper square and the Adapter Shank, with its 6 "hex flats", chucks perfectly in power drills or hand braces, either one. No wobble, no run-out. Clean, efficient cutting action. Reduces inventory and record keeping by 50%. Saves time on the job, too. Call your distributor, or write today for complete information. Sizes 4/16" to 17/16", both solid center and single twist types.

All Irwin Adapter Shank Wood Bits are forged in one piece from special steel and heat tempered full length for longer life. Plastic coating on balanced cutting heads guarantees factory-fresh sharpness, unequalled performance. Widely used by utilities, electricians and construction workers.

IRWIN auger bits • screw drivers
Wilmington, Ohio

In the first phase, or theory, terms that have followed, the student group—so far as has been practicable—has included one plant and one engineering student from each of Southern Bell's state offices and general office. Also eligible for the theory application phase, are these junior engineers, engineers and supervising engineers in transmission work, and plant transmission maintenance supervisors.

Candidates for the school are named by the chief engineer and state plant manager in each state. Final selections are made by the company's chief engineer on the basis of formal education, work assignment and experience. A maximum of 25 persons can be selected for each term.

In preparation for the school, each student is expected to complete reading assignments in two books on electrical communications and principles of electricity related to telephone and telegraph work. The company lends these books and the textbooks used in the school to the students. At least one copy of each book is kept on file in the offices from which candidates have been selected.

Once a student begins a term in the communications engineering school, his daily routine is not unlike that of other students at Clemson. He lives in a dormitory. He eats in the campus dining hall. He attends 24 hours of classes between 8 a.m. and 5 p.m., Monday through Friday. He prepares assignments in the college library or his dormitory room. He studies or relaxes in a dormitory lounge. He follows all rules and regulations governing student life at Clemson.

Southern Bell views this on-campus communications school preferable not only from an educational standpoint, but from an economic one as well. A contract with Clemson makes provisions for costs for faculty, classroom space, dining room facilities, an administrative office, and a dormitory section for the exclusive use of Southern Bell students.

At the present time, enrollment in the Southern Bell school is limited to company personnel, and no college credit is given for the course. However, Clemson students who are interested have been invited to visit the classes so far as space permits.

By the time the final session of the school has been held in the latter part of 1958, Southern Bell expects to have had 150 men complete the communications engineering training.

No Time Saved Here

Jaywalking was costly in the U. S. in 1956—3,170 were killed.

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What You Want
When You Want It

Prompt delivery of your order as specified is assured by Lindsay's fast, efficient, *personalized* service . . . plus a complete line of nationally known telephone supplies. Remember—Lindsay *specializes* in telephone supplies *only*—your guarantee that you can "Look to Lindsay" for satisfaction on every order. Phone or write for immediate delivery or required data.

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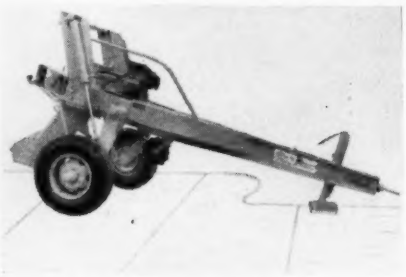
XUM

Lay Cable the Modern Way—

Ryan Underground Wire and Cable Layers



LATEST PULL TYPE

Will handle all types and sizes to 3¼" diam. up to 42" depth. Electric brakes for highway travel optional. Av. Operating Cost 1c to 3c per ft. From $7,000.

ECONOMICAL—

Companies and contractors, both large and small in the U. S. and foreign countries have learned how they can increase profits, do the job in a fraction of the time by use of Ryan Cable Layers. Join them today!

FOR DIRECT BURIAL OF TELEPHONE OR ELECTRIC CABLES—

Now a size and type to fit your requirements.

All size machines equipped with the Ryan patented blade—your assurance against damaged cable.

NEW TRACTOR MOUNTED—

Will handle all types and sizes to ¾" diam., 18" to 24" deep. Can provide for additional depth. Ideal for farm lines, housing projects. Front mounted hydraulic reel carrier optional. Av. Operating cost less than 1c per ft. From $5,500 including tractor.

For Further Information Write or Call

Phone 89 F. B. RYAN CO. Chariton, Iowa

Just the right capacity for line work...

develops 1500 watts; weighs only 125 pounds; 4-cycle engine power

This workman is drilling holes in a cross arm with power from an Onan 105AK. Unit can also be removed from truck and easily carried to where it's needed.

Prices reduced on many popular models!

Onan Model 105AK-1P Electric Plant

This power-packed lightweight plant supplies all the power you need for electric drills, saws and other equipment . . . and for floodlighting on night jobs, too!

Quick-starting, 4-cycle Onan air-cooled engine is direct-connected to Onan all-climate generator in a single, permanently-aligned compact unit.

Four plug-in receptacles, pilot light and carrying frame are standard. Other lightweight portable and mobile Onan plants from 500 to 10,000 watts.

To save time and speed work on construction and maintenance projects, equip your crews with Onan Portable Electric Plants.

Call your Onan distributor or write . . .

Onan ELECTRIC PLANTS

D. W. ONAN & SONS INC.

4059 University Ave. S.E., Minneapolis 14, Minnesota

THE OSCILLOSCOPE

Concluded from page 26

Tubes can be checked to the extent of measuring the gain they furnish in service, by measuring the voltage into and out of the circuit in which they are placed. In addition, it is possible to make test connections whereby the "scope" can show the plate curves for different operating conditions just as they are in the tube manuals.

Certain specific tests have already proved the worth of the oscilloscope. In one company the "scope" was used as a null indicator on a capacitance bridge when balancing quadded cable. In this operation, the splicer normally selects quads in a splice which have equal and opposite unbalances. By splicing these he put together a cable which requires but little balancing in the final splice.

A capacitance bridge and tone generator are used for this, and a headset is used to listen for the null on the bridge. This is a slow and tedious job, because listening for the null in a noisy location strains the hearing and necessitates many tries. Using a "scope" instead of a headset enables the splicer to see instead of hear the unbalance. Further, the "scope" will show unbalances too small to be heard.

On one such installation, a job estimated to last three to four months was completed in two months by using an oscilloscope.

The next article in this series will deal with the non-electronic elements of telephone plant—the relays.

Ormas G. Smith, chief engineer for Illinois Bell Telephone Co., who recently was elected president of the 3,000-member Western Society of Engineers, headquarters of which is in Chicago.

Lincoln T&T Plans First DDD Installation in Neb.

Four exchanges of The Lincoln (Neb.) Telephone & Telegraph Co. will be converted to automatic operation in June. They are Ashland, Carleton, Beatrice and Pickrell. Together they serve 6,920 stations.

Nebraska's first installation of Direct Distance Dialing (DDD) will be ushered in with the Beatrice conversion. Subscribers at Beatrice, DeWitt, Filley, Pickrell and Plymouth will be able to dial direct to about 250,000 telephones in 35 exchanges in southeast Nebraska.

Automatic Electric SATT equipment will provide the direct distance dialing service. Calls from business telephones at Beatrice will be fully automatic. Other calls will require operator intercept for recording of the calling number.

New buildings are under construction also at Wahoo and David City. Dial service and DDD will be ready for service in 1958. These exchanges serve 3,000 telephones.

After the June conversions, about 84 per cent of LT&T's 130,000 telephones will be dial-operated. Ninety-two of its 125 exchanges will be automatic. Target date for 100 per cent dial operation is 1962.

E. C. Smith Affiliates with Architect, Engineering Firm

Emerson C. Smith, consulting communication engineer, has announced his affiliation with Law & Wilson, architects and engineers of Honolulu, Hawaii.

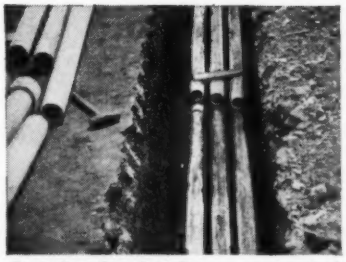
The services of Emerson C. Smith & Associates will continue to be available for communication engineering involving outside plant, transmission, protection, traffic, central office equipment, and radio. These services will be complemented by the architectural, structural, civil, mechanical, and electrical engineering services of Law & Wilson.

Mr. Smith is the compiler of the "Glossary of Telephone Words and Terms" (reprinted from TELEPHONY), of which 40,000 copies have been sold.

E. H. Royce Elected Head Of Nebraska Pioneers

E. H. Royce of Lincoln, Neb., was elected president of the Frank H. Woods Chapter of the Independent Telephone Pioneer Association in a statewide election conducted by mail. He succeeds Myra Metcalf of Lincoln.

The announcement was made on June 8 at the chapter's annual reunion ban-



Transite Conduit is as economical for main banks as for lateral construction. It also saves maintenance.

Unusually corrosive soil required Transite Duct to replace another type in this telephone cable system.

write today for your free copy

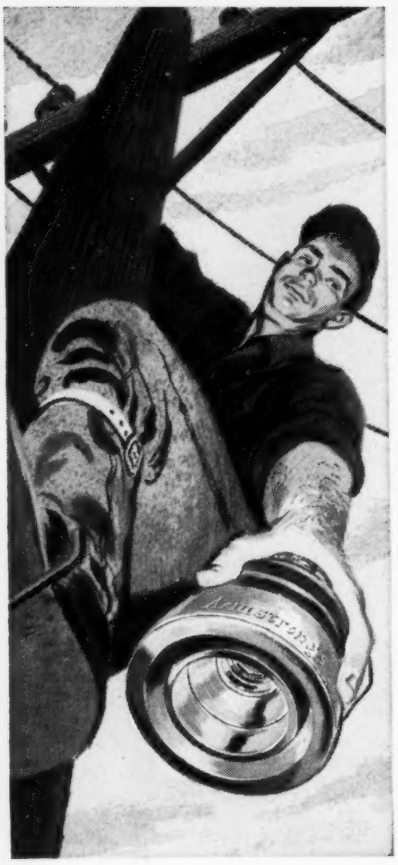
THIS EASILY READ BOOKLET tells why more and more telephone companies now use Transite® asbestos-cement ducts—an improved, permanent type of cable protection that costs less. The ducts, being inorganic and nonmetallic, cannot rust . . . are immune to electrolysis . . . resist soil corrosion. They withstand all normal stresses. Thus, maintenance is practically eliminated.

Transite Ducts save installation costs. The sections, being 10 feet long, mean fewer joints in the completed line. Lightweight, easily handled, they are readily assembled and disassembled.

In direct buried lines, the tight joint provided by Transite Conduit excludes water and silt from duct interior. This eliminates cleaning of ducts. Additional savings are realized by pneumatic rodding instead of the hand rodding that is necessary with less effective joints that, being less effective, permit leakage.

Other features of Transite Ducts are also covered in the new booklet, EL-29A. Write Johns-Manville, Box 14, New York 16, N. Y. In Canada, 565 Lakeshore Rd. E., Port Credit, Ontario.

Johns-Manville TRANSITE DUCTS



Smooth seams

All Armstrong Glass Insulators have an important thing in common: smooth seams. There's no danger of cut hands for linemen, for every insulator is carefully inspected for smoothness before it leaves the lehr. Get complete data on these fine insulators by writing Armstrong Cork Company, Glass and Closure Division, 295 Fifth Ave., New York 16, N. Y.

Watch Armstrong Circle Theatre every other Tuesday evening on NBC-TV

Armstrong
GLASS INSULATORS
for communications . . . for power

quet at the Cornhusker Hotel in Lincoln.

Other officers elected were K. J. Boshart of Lincoln, vice president; Kathryn Portsche of Lincoln, secretary; and Carl Ahl of Lincoln, treasurer. A. S. Keckler and R. J. Connors of Lincoln were elected to three-year terms on the executive committee.

INDIANA CONVENTION

Concluded from page 31

linger on in the hearts of her friends and co-workers.

"In bidding adieu to Marie, let us also extend our best wishes to her successor, Marjorie May, with the hope that she, too, will enjoy many good years of service in a position that is interesting, satisfying, and at times a little discouraging and disappointing. A traffic supervisor gives so much, and receives so little in return, never knowing how the seeds she has sown are growing and progressing.

"Marie, on behalf of all the girls with whom you have worked, and the companies you have served, may I express their appreciation for your many years of loyal service. It is their hope, and mine, that your leisure years will be filled with happiness, contentment, good health, and all the blessing you so richly deserve.

"I'm grateful to have been chosen to pay this tribute to you. It has been a privilege to enjoy your friendship and to fraternize with you during our many years of service in the industry we love —telephony.

"I shall look forward to many happy meetings with you in the future at our Pioneer get-togethers, especially the annual meeting of the J. K. Johnston Chapter of Indiana, to which you contributed so generously of your time and effort in its formative period.

"In closing my tribute to you, I am reminded of a little verse that might have been written just for you.

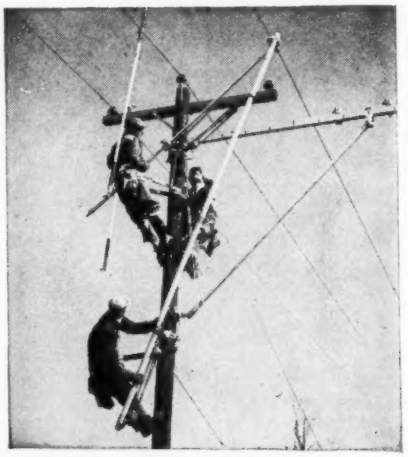
"Someone Like You

Someone like you makes the heart seem the lighter,
Someone like you makes the day's work worthwhile,
Someone like you makes the sun shine brighter,
Someone like you makes a sigh half a smile.
Life's an odd pattern of briars and roses,
Clouds sometimes darken, no sun shining through,
Then the cloud lifts and the sunlight discloses
Near to me, dear to me—someone like YOU.
God bless you—Marie!"

Measure of Worth

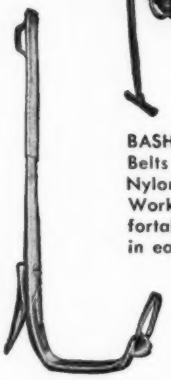
"Every person is responsible for all the good within the scope of his abilities, and for no more, and none can tell whose sphere is the largest."—GAIL HAMILTON.

Bashlin's Quality
FOR OVER 30 YEARS



TOOLS OF SAFETY . . .

BASHLIN Quality Body Belts with the additional Nylon Safety Feature . . . Work Safely . . . Comfortably . . . with tools in easy reach.



BASHLIN Quality Alcoa Aluminum Alloy Adjustable Climbers with replaceable gaffs . . . There is nothing better anywhere!

BASHLIN'S Nylon and leather Safety Straps . . . Bashlin Quality, of course.

You Can't Afford Anything LESS Than the BEST—
Buy BASHLIN
Highest Quality For Over 30 Years
Distributors in Strategic Areas in U.S.A.
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Ask for . . .
CATALOG NO. 156

W. M. BASHLIN CO.
GROVE CITY, PA.

C&D Names Carlile Chairman And Rittenhouse President

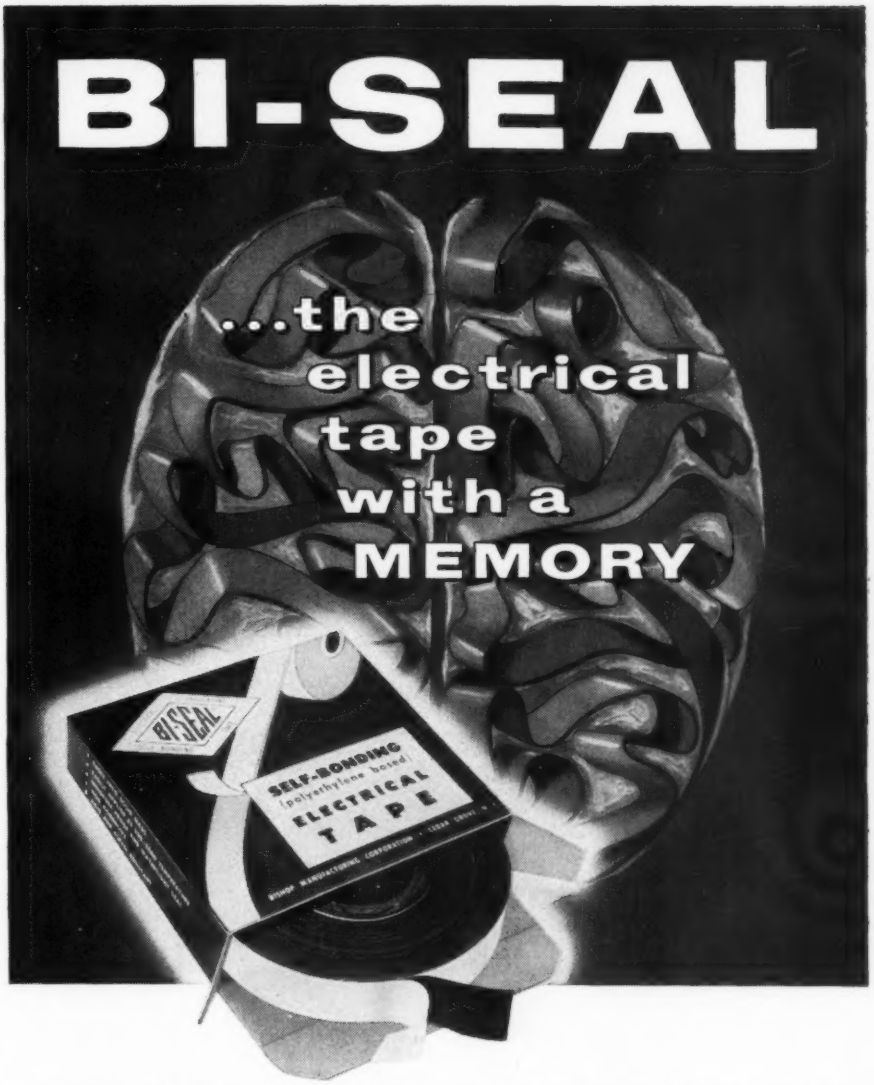
John F. Rittenhouse, executive vice president since 1953, has been named the new president of C&D Batteries, Inc. He fills the post left vacant by the sudden death on May 18 of Leon A. Doughty, former president and one of the two original founders of the company.

J. F. RITTENHOUSE

F. S. CARLILE

Announcement of the election was made by Frank S. Carlile, following a meeting of the board of directors on May 28 to elect new company officers. Mr. Carlile, who founded "Carlile & Doughty" together with the former president back in 1906, was elected to the newly created post of chairman of the board. He had been vice president and treasurer of the firm, manufacturers of industrial storage batteries, with plants in Conshohocken Pa., and Attica, Indiana.

The board of directors also made the following changes in the management



Bishop's Bi-Seal, a self-bonding (polyethylene based) electrical tape, possesses the unique characteristic peculiar to many plastic products . . . a retentive memory. When Bi-Seal is stretched during a normal splicing operation it "remembers" its original shape and fuses into a tight, homogeneous mass in an attempt to return to its normal form.

Within seconds a Bi-Seal splice has become a long-lasting, water tight seal, virtually non-absorbent and offering high dielectric strength and unusual resistance to moisture, corrosive atmospheres and chemicals.

Bi-Seal performs efficiently on any insulation and is unexcelled for cold weather applications, as low as —55°C. . . . never brittle, never shatters, conforms perfectly to the most complex shape or contour . . . lasts as long, or longer than the original insulation.

Highly recommended for communication and power distribution wire and cable splicing, moisture-proofing bi-metal connections, sealing corrosion-resistant conduit couplings, and insulating high frequency electronic circuits. Accepted by REA for insulating plastic telephone cable.

Write today for your free copy of Bishop's new tape catalog.

Bishop Bi-Seal is available from your distributor.

INDEPENDENT

ELECTRICAL INSULATING BI-SEAL SELF BONDING TAPE

BISHOP

MANUFACTURING CORPORATION

12 Canfield Rd., Cedar Grove, New Jersey

XUM

FLOTROL Carrier Supply units

Model CS-1 with cover removed to show components.

FLOTROL CARRIER SUPPLY UNITS are designed to supply regulated 130 volt plate current for carrier or repeater operation. The units normally operate from 115 volt 60 cycle single phase power supply, and will automatically transfer to a built-in standby vibrator which operates from the exchange battery upon power interruptions, maintaining uninterrupted plate current during power failures. Regulated voltage is maintained during both normal and standby operation. CS units are housed in attractive light gray steel cabinets, and can be mounted on the wall or in a 19-inch relay rack.

LORAIN Products Corporation

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POWER EQUIPMENT FOR COMMUNICATIONS AND INDUSTRY

FLOTROL PARTNERS IN DEPENDABILITY SUB-CYCLE

GENERAL MACHINE PRODUCTS COMPANY, INC.
Franklin & Wood Sts.,
Philadelphia 6, Pa.

Distributed by Graybar

#7458 SEALING COMPOUND. The C Resin Compound and activator, when mixed together, produce the proper proportion of flowable compound, known as one unit, to produce a plug or dam when desirable to sectionalize cable and seal cable terminals. The compound and activator is packaged in two sizes; regular size 50 gram compound and 19 gram activator, large size 168 gram compound and 64 gram activator. Additional information is available on installation and on the tools required.

SPECIALIZED COMMUNICATIONS EQUIPMENT SINCE 1918 GMPCO

of the firm. Stewart E. Doughty, a company director and son of the former president was elected new company treasurer. Thomas L. Caldwell, secretary, was named to fill the new post of comptroller in addition to his present duties. Louis M. Eble Jr., a director, was named a vice president and H. Russell Stewart, presently assistant to the vice president in charge of engineering and marketing, was made a director.

One other management post is unaffected with Henry E. Jensen remaining as vice president in charge of engineering and marketing. A new executive vice president to replace Mr. Rittenhouse, has not been named.

Except for brief stints with E. I. DuPont and Ideal Industries during the early 40's, John F. Rittenhouse has been associated with C&D Batteries since his student days at Drexel Institute of Technology. After graduation in 1935 he joined C&D's engineering department on a full-time basis. Rittenhouse became chief engineer in 1943, vice president in charge of engineering in 1950, and executive vice president of the company in 1953.

The new C&D president is a member of the Electrochemical Society and the technical committee of the American Association of Battery Manufacturers.

Frank S. Carlile, the "C" of C&D Batteries, formed his first "partnership" with Leon A. Doughty when they were both students in Philadelphia's Central Manual Training High School. C&D Batteries was incorporated in 1912 and celebrated its 50th anniversary last year.

Vadersen to Manage FTL Telephone Projects

The appointment of Charles W. Vadersen to the post of manager, coordinated telephone projects, at Federal Telecommunication Laboratories (FTL), Nutley, N. J., was announced on May 22 by President Henri G. Busignies. The laboratories are the American research division of International Telephone & Telegraph Corp.

Mr. Vadersen will coordinate activities in telephone systems being developed at FTL for Kellogg Switchboard & Supply Co., Chicago, another IT&T division.

Prior to joining the laboratories, Mr. Vadersen was director of design and development for the North Electric Co., and had held the post of director of research and product development with the Gray Mfg. Co., Hartford, Conn.

Between 1948 and 1952 Mr. Vadersen served as research director and later chief engineer of the Acousticon division of Dictograph Products, Inc.,

C. W. VADERSEN

where he was in charge of all phases of hearing aid development and product design.

A graduate of New York University with a Bachelor's and Master's degree in Electrical Engineering, Mr. Vadersen was a member of the technical staff of Bell Telephone Laboratories, where he was active in the early application of information theory to frequency band compression and secret transmission of speech signals. During World War II, Mr. Vadersen participated in the development of equipment for secret military communications and directed the installation of such equipment in Southwest Pacific Headquarters. He was active in the visible speech program in the immediate postwar years, functioning as project engineer for development of a production model of sound spectrograph.

He is a member of the Institute of Radio Engineers, the Acoustical Society of America, and the American Association for the Advancement of Science, and has served on committees of the American Standards Association.

Centralization Takes Root

"Once centralization of government functions begins it is hard to stop. Let Washington start contributing to the upkeep of schools and next year the contribution will increase and increase again in the year after that. Once the process of subsidizing the farmer begins and the federal government has assumed responsibility for farm welfare, by what argument does it make the farmer less than fully prosperous? If the federal government subsidizes the user of electric power in one section of the country, by what argument can it refuse a similar subsidy to another section?"—WILLIAM H. GRIMES, *editor, The Wall Street Journal.*

Telephone batteries engineered for—

extra-dependable power . . . plus!

C & D PlastiCell®

Extra-dependable packaged power! Extra advantages, too!

The best "salesmen" for C & D PlastiCell® batteries, you'll find, are the large number of friends these *advanced-engineered* batteries have made among telephone men in important exchanges across the country. C & D PlastiCell telephone batteries give you much more than extremely reliable power. You also get:

- **One-piece, permanently-sealed plastic case.** Entire unit is shock-resistant . . . lighter and more compact than glass or rubber.
- **More compact installations.** With smaller dimensions for a given capacity, C & D's take up less battery room space.
- **Easier maintenance.** Patented Post Seal eliminates acid creepage.
- **Lower costs.** Light plastic case reduces shipping costs . . . total in-place costs.

These plus many other benefits mean that in the telephone field, C & D is—

Your better battery buy!

Literature available

Write for complete description and specification in C & D PlastiCell Bulletin T-527

C&D **BATTERIES, INC.**

of Conshohocken, Pa.

SINCE 1906

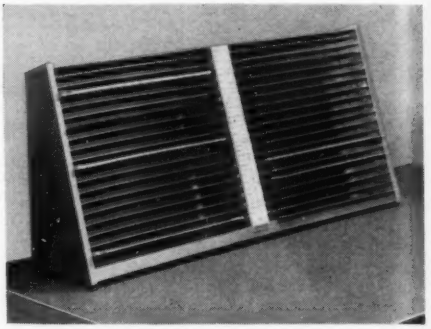
SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

News on New Products

TROUBLE RECORDER CARD RACK—The job of sorting trouble recorder cards in cross-bar offices is made easier by the use of this new rack offered by Neubauer Mfg. Co.

The rack is especially designed to handle the cards used in Bell System cross-bar offices for recording line and service troubles; has 38 card slots arranged in two banks with an index strip between. Four smooth glides support the rack which measures 38 inches x 8 inches at the base with a height of 15 inches.

Neubauer Mfg. Co. also makes special drawing tables and work-benches



for telephone office use, as well as steel library shelving and open-shelf filing equipment. Request NP678.

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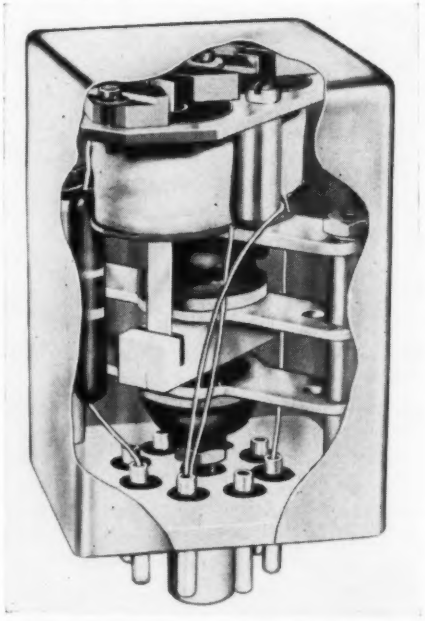
RESONANT REED OSCILLATOR CONTROLS—James G. Biddle Co. announces availability of Frahm® resonant reed oscillator controls for maintaining oscillator output within close limits. The oscillator controls are also used as electro-mechanical bandpass filters.

The company lists the following features:

High accuracy.
Stability of frequency control.
Self starting.
Infinite service life.
Integral, sealed, magnetically shielded.
Standard octal tube pin connectors.
Small, light weight.



These new Frahm oscillator controls, types ROC4 and ROC2, make possible the design and construction of inexpensive, precision-tone generators that

(Please turn to page 62)

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Please have the manufacturer send me without obligation the literature indicated by the following numbers:

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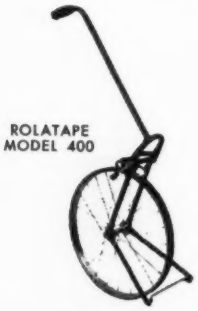

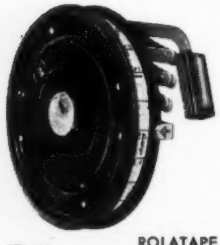

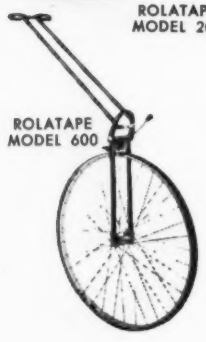

ROLATAPE is the Fast, Efficient, Economical Modern way to measure. Model #400 is widely used by Road Construction Companies, Telephone Companies, Utilities, Sewage Departments and many other industries where measurements are important.

MEASURING time is cut to a fraction with Rolatape. Model #200 is extremely popular with Real Estate Men, Appraisers, Traffic Officers and many others who demand fast, accurate, measurements.

WHEELS on all Rolatapes are precision calibrated, and can be depended upon for long-life service. Model #600 is a special model for long-distance, acreage measuring and for use over rougher terrain.

FOR FAST, ACCURATE measuring—Rolatape Measuring Wheels are the answer. Models #400 and 600 measure distances up to nearly nineteen miles.

MEASURING is simple, time-saving, and efficient when you use a Rolatape. FOR COMPLETE DETAILED ROLATAPE INFORMATION, SEE YOUR DEALER, DISTRIBUTOR, OR WRITE TO:

ROLATAPE, INC.
Factory: 1741 Fourteenth Street, Santa Monica, California

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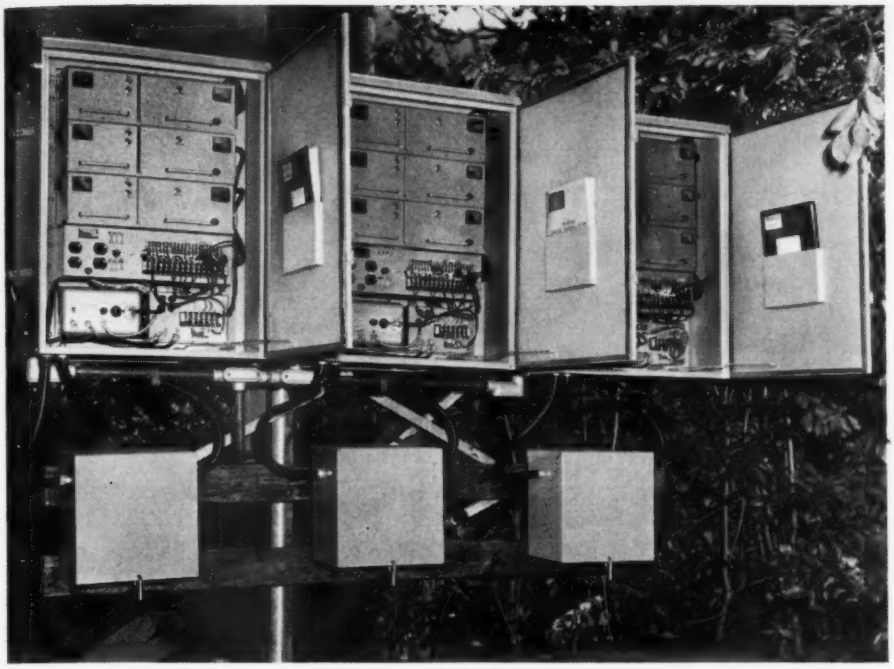
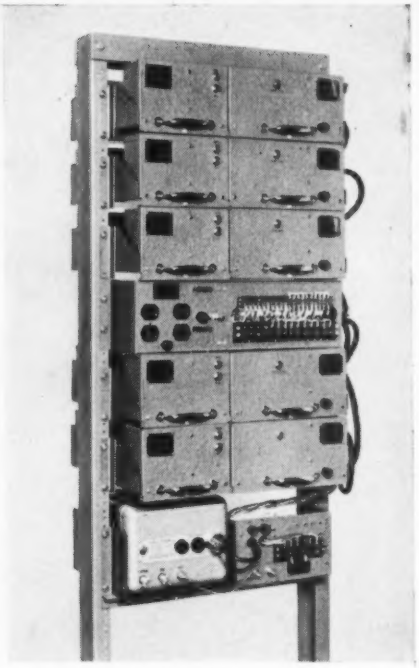


Lynch B-120 Subscriber Carrier equipment can be mounted in a Central Office 19-inch relay rack or in a Lynch A-48 weather-proof pole-mounted box.



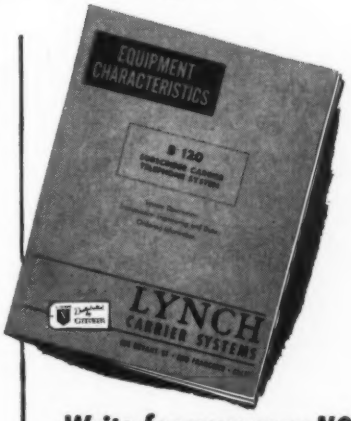
The Lynch B-120 is a carrier system which provides an economical means for increasing the capacity of a party line.

How to put more toll circuits to work on existing lines...via Graybar

You can provide one to five individual carrier telephone channels with the new Lynch B-120 subscriber carrier telephone system—available from Graybar. You can superimpose all five channels on a telephone pair that may be carrying ten-party subscriber service. Each channel, working as a separate entity, complete with signalling, operates without interference with other channels or existing subscriber circuits.

You gain these 4 important advantages when you install the Lynch B-120:

1) Lower crosstalk levels; 2) lower operating frequencies; 3) more circuits on the same pole line or in the same entrance cable; 4) usable with any type of ringing system now in common use. For catalog and price information, plus seasoned help on any phase of carrier operation—call Graybar. Add our years of experience in telephony to yours and the toughest problems will get sound solutions—fast. 732-237



Write for your copy NOW!

"Equipment Characteristics" is a 74-page manual carrying a complete description of Lynch Carrier Systems, with a wealth of transmission engineering information and data. Write Graybar for a copy today. It will be mailed,—no charge or obligation.

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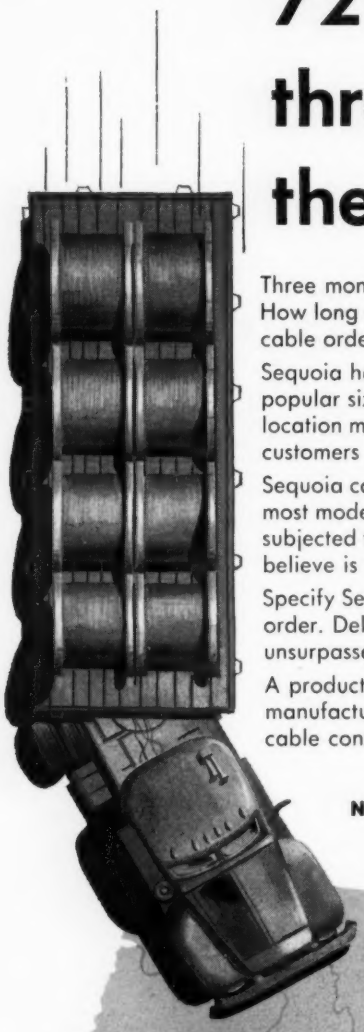

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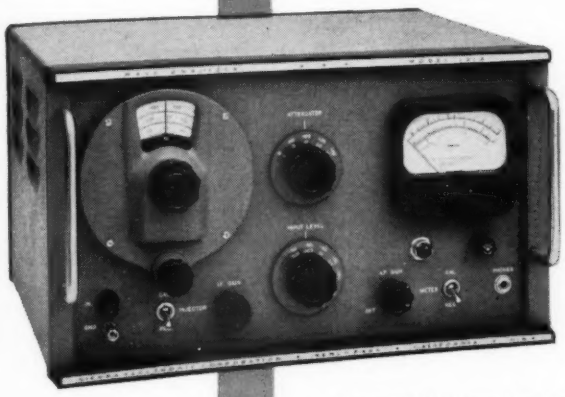


Sierra 121A Wave Analyzer

Sierra now offers exactly the instruments you need for wave analysis, wire carrier and microwave subcarrier applications.

Sierra 121A Wave Analyzer is a highly selective, double superheterodyne receiver covering frequencies from 15 KC to 500 KC and providing wave analysis data directly in voltage and dbm at 600 ohms. The instrument offers the selectivity required for use with new single sideband carrier systems.

Sierra 158A Wave Analyzer is similar but covers frequencies from 500 KC to 10 MC.

Both analyzers have high selectivity, accuracy of ± 2 db, spurious response at least 50 db down, and a signal-measurement range of 77.5 μv to 97.5 volts. The instruments are supplied in cabinet mountings which are readily adaptable to relay rack mounting.

SPECIFICATIONS — SIERRA VOLTMETERS

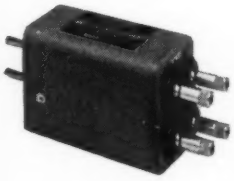
Model	Frequency Range—kc	Selectivity		Accuracy		Direct Reading in dbm	
		Down 3db	Down 45db	Frequency	Measuring	Balanced	Unbalanced
101C	20-500	± 550 cps	± 2900 cps	Note A	± 3 db	Note D	600 ohms
103B†	3- 40	± 400 cps	± 3000 cps	± 0.5 kc	± 3 db	Note D	600 ohms
104A	5-150	± 300 cps	± 1500 cps	± 1 kc	± 3 db	Note D	600 ohms
108B	15-500	± 550 cps	± 2900 cps	± 3 kc Note B	± 2 db Note C	135 ohms Note D	600 ohms
114A	100-800	± 550 cps	± 2900 cps	Note A	± 3 db	Note D	600 ohms

All Sierra Carrier Frequency Voltmeters feature built-in calibration oscillators and circuits for level calibration, have aural monitoring jacks, and (except 103B) are furnished with Sierra Model 149A Precision Spiral Scale Dials.

† Contains carrier re-insertion oscillator for monitoring suppressed carrier systems. Furnished with planetary drive dial. Note A. Ranges from ± 2 KC at low end of dial to ± 3 KC at upper end. Note B. ± 1 KC in the 48 KC to 256 KC region. Note C. ± 1 db for + 30 db to — 40 db attenuator steps on 135 ohm balanced measurements. Note D. All models may be converted for 135 and 600 ohm balanced line measurements by convenient plug-in bridging transformer, Model 130D.

Sierra 101C Carrier Frequency Voltmeter

For carrier system and other field or laboratory work between 3 kc and 800 kc, Sierra offers 5 accurate, stable, tuned vacuum tube voltmeters. All are direct reading in voltage and dbm at 600 ohms from —80 dbm to +42 dbm.



Line Bridging Transformer

Model 130D Dual Impedance Line Bridging Transformer converts VTVM and wave analyzer inputs from single-ended to balanced operation. Covers 3 kc to 500 kc, bridges both 135 and 600 ohm balanced lines.

Impedance Meter, Line Fault Analyzer

Sierra 166 Impedance Meter (at left) measures impedance on high noise circuits, 30 kc to 300 kc; measures on "hot" lines through coupling capacitor.

Sierra 124 Line Fault Analyzer pinpoints shorts, opens or grounds on open wire lines. Direct reading, range ½ to 200 miles, accuracy ¼ mile.

Data subject to change without notice.

sierra

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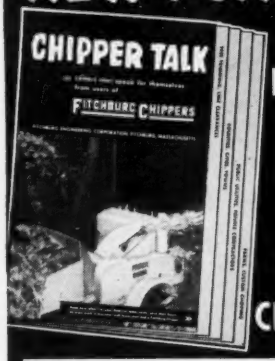

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are small and light-weight. These generators will have accurate output frequency and output voltage with very nearly sinusoidal wave shape, the company states.

These resonant reed oscillator controls are strictly circuit components for electric oscillators. They can control frequency but cannot produce or sustain electric oscillations when used by themselves, without appropriate electric oscillatory circuits. They can be used without modification as electro-mechanical bandpass filters.

Frahm oscillator controls can be made with any one nominal control frequency between 20 and 1100 cps. They will control the output frequency of circuits, under specified conditions, constant within ± 0.15 per cent of the nominal control frequency.

Frahm oscillator controls have these applications:

Electrical and acoustical measurements.

Electrical communication systems (selective calling).

Remote operation and supervisory control of machinery and apparatus.

Electrical computers and telemetering systems.

Electro-mechanical bandpass filters.

Inquiries and correspondence on special applications and problems are invited. Just off the press—a new bulletin with detailed specifications, performance characteristics and application data including circuits. Write for bulletin 34-41 or request NP679.

•

CORONA TEST SET — The Biddle company also has announced a new corona test set, Model 2, for non-destructive evaluation of electrical insulation in transformers, cables, capacitors, and other electrical components (for ionization starting voltage at 60 cycles).

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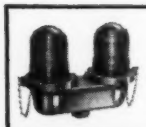
MODEL OB21 is of the SIDE ENTRANCE conduit fitting type in order to facilitate installation on horizontal conduit runs. Available in ¾" or 1" conduit tap

MODEL OB20 is of the BOTTOM ENTRANCE conduit fitting type to facilitate installation on vertical conduit stubs. Available in ¾" or 1" conduit tap



MODEL OB22 DOUBLE LIGHT is available with or without CABLE SUPPORT — also available with TRANSFER RELAY. 1" conduit tap

Request Descriptive Bulletin HPS-138

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This model, like all previous ones, has been designed for service under severe conditions in research and development laboratories and for quality control in industrial plants, the company states. Great pains have been taken to make it rugged, easy to install and to operate by personnel not specially trained for making this type of electrical measurement. Care has been taken to make the indication of corona as simple and self-evident as possible. Considering its test output voltage and power, this equipment is relatively compact and portable.

Corona is displayed as individual pulses on the screen of an oscilloscope with straight horizontal sweep synchronized with the test voltage. As corona starts at the maximum amplitude of the test voltage, the first pulses will appear about the center of the screen when corona starting voltage is reached.

This equipment, says the company, offers a decided advantage in practical testing in that it makes possible the grounding of one terminal of the component under test.

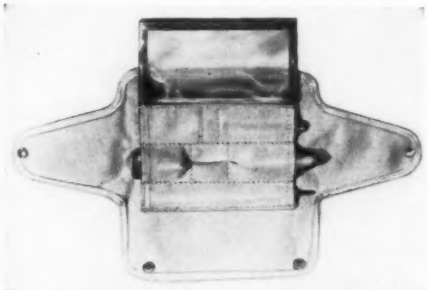
As shown, the control cabinet and test transformer are available as separate units on carts for mobility, for testing specimens with terminal capacitance up to 0-15 MUF and impedance to ground of 20,000 ohms or more. (Power output maximum 20 kva at 20 kv 60 cps.)

On special order this equipment can be supplied for maximum output power of 20 kva at maximum test voltage of 30 kv 60 cps.

There are other models and ratings to suit your applications. Write for bulletin 66-41 or request NP680.

•

GAFF SHAPING KIT—All companies have had the problem of correctly shaping and maintaining the linemen's gaffs, the W. M. Bashlin Co. states.



Bashlin's No. 27 gaff shaping kit has been designed to eliminate this problem. This kit contains all the correct tools and illustrated instructions. A lineman following the simple step-by-step procedures, illustrated and explained in the instructions, will maintain a properly-shaped gaff for safe climbing and long gaff life.

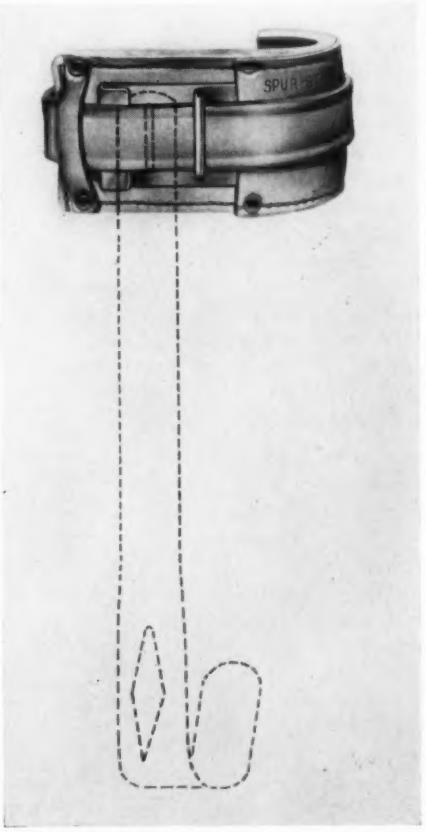
The kit contains a file and handle, gaff support, rod, gauge, finishing stone and instructions in a compact folding case measuring 10 inches x 4 inches x 1½ inches. Request NP681.

•

SPUR-STAY PAD—The Bashlin company also has observed that kick-back on linemen's climbers has been a problem to the lineman for many years.

Bashlin's No. 105 spur-stay pad is the first new pad since Bashlin's No. 130-D boomerang pad which was introduced in the 1930's.

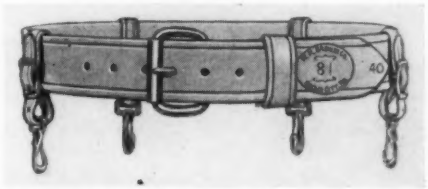
Using the spur-stay pad, the lineman can adjust the pad and choose the most comfortable position for the climber to rest.



This No. 105 pad eliminates the majority of the kick-back and twisting which, the company states, is common in climbers. Request NP682.

•

SUPPORTER STRAP — The new Bashlin No. 81 supporter strap com-



bines safety with comfort in placing the lineman's body belt in the correct wearing position. The supporter strap distributes the weight of the belt and

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Shear-action cutter — for general cutting of all soft or hard steel cable or wire rope up to ¾". Notched jaws lock cable during cut, minimizing deforming.

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tools evenly when the lineman is on the pole or on the ground.

The strap is made of tough, pliable leather with sturdy snaps to engage it to the belt. Request NP683.

•

GUN TACKER SAFETY FEATURE—A new safety device for their popular all-purpose T-50 automatic gun tacker has been announced by the Arrow Fastener Co.

The company has designed a new spring-steel catch mechanism for the pusher rod of the T-50 that locks the rod so firmly in place that it cannot accidentally be dislodged. (The pusher rod is the long steel rod with a spring mechanism that feeds staples as the gun's trigger is squeezed.)

Arrow's new high-tension spring steel mechanism is designed to put sufficient pressure on the engaging catch of the pusher rod so that it cannot be jarred loose in a workman's pocket or even if the gun is dropped from extreme heights. Arrow engineers subjected the new catch to the most rugged "falls" and torture tests and found it to be virtually shockproof. Arrow's T-50 can be used for doing many jobs such as fastening ceiling tile, insulation, carpeting, wire fencing, linings, etc. Request NP684.

•

SAFETY CABLE REEL BRAKE—A new time and labor-saving cable reel brake manufactured by Utility Tool & Body Co. assures a steady pay-out of cable, wire or strand, as it is required, the company reports.

Controlling the pay-out without a brake is difficult, for the reel may overrun. Other more complicated brakes or makeshift methods are sometimes used to brake the reel, but these methods are generally more costly and sometimes unreliable.

The Utility cable reel brake is made in accordance with strict specifications yet is simple in design and operation. It consists chiefly of a brake drum with band and adjusting bolt assembly, anchor for brake band, and a clamp for locking the cable reel to the spindle. In the accompanying cut, an operator is adjusting a nut on the brake band to apply proper braking force on brake drum which is welded to cable reel spindle.

The brake drum shaft is inserted into the bore of the tubular cable reel spindle and is welded to it. The anchor assembly of the brake is bolted to the trailer directly under the spindle support. The brake band is clamped around the drum and is prevented from rotating by the anchor.

The adjusting nut which is used for clamping the band around the drum

provides a means for varying the braking force on the cable reel spindle. The brake band may be slipped on and off the drum as desired.

In operation, tightening the adjusting nut on the brake band gives the desired braking effect. The cable, wire or strand can now be paid out without danger of the reel unwinding too fast and without requiring the constant attention of one of the men in the cable-placing crew, according to the company.

The cable reel brake becomes an integral part of the cable reel trailer and is always ready for use. Or, if desired, the brake can be transferred from one trailer to another by exchanging the spindle complete with brake.

The company states the unit is readily serviced; parts, if required, are available from stock. Request NP685.

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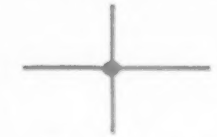
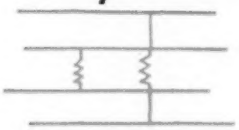
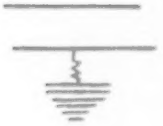
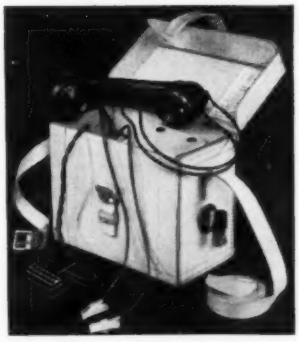
a B-N booth is a busy booth!

Once upon a time there was a little telephone line. He was very high strung and lived far out in the country. During a storm he became very ill: he developed a short,  a cross,  and a ground.  Even his feathered friends avoided him. When the storm was over, a man appeared carrying a small leather case, and in no time at all the little telephone line was well again, happily carrying calls. He's still puzzled, though, how the man found his troubles so quickly. You see, he doesn't know about West Test Set.



Moral: To find line troubles fast - use WEST TEST SET

With a West Test Set, one man can clear up miles of line trouble in just one day. More and more companies are using West Test Set for trouble shooting on all types of circuits, and as portable telephones. Write today for full details. *Address: Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7. Or call HAymarket 1-4300.*

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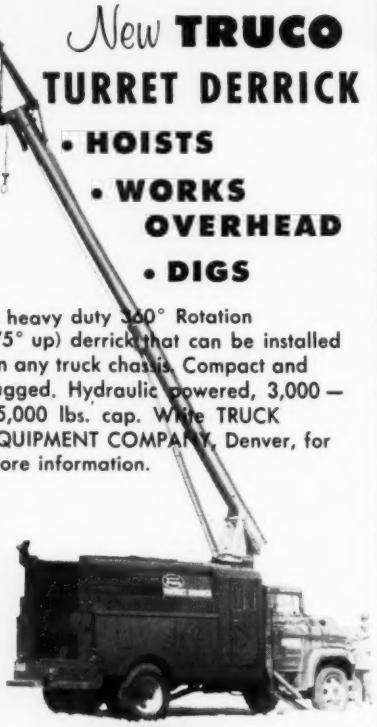

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TRUCK Equipment CO.
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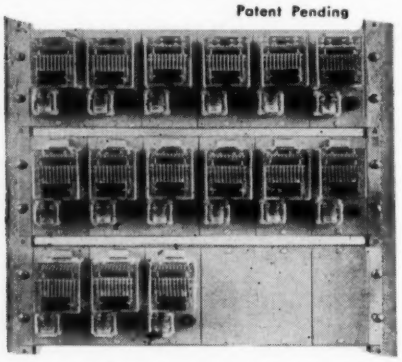
CODE-TO-SELECTIVE RINGING CONVERTER

Patent Pending



Furnishes full, ten-party selective ringing on multi-party lines. Use with present switchboard and line equipment. Existing equipment does not require modification . . . fits any standard rack. Factory wired for quick installation. Flexible for future growth.

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Stahl Metal Products Names Hull Sales Vice President

Stahl Metal Products, Inc., Cleveland, has just announced the appointment of Ronald E. Hull to the position of vice president in charge of sales.

R. E. HULL

Mr. Hull joined Stahl, builders of utility truck bodies and trailers, approximately one year ago, as general sales manager after long experience in the utility body field.

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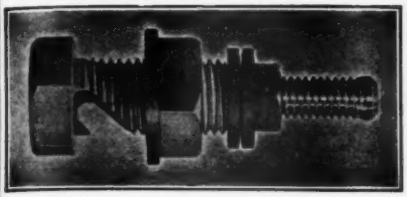

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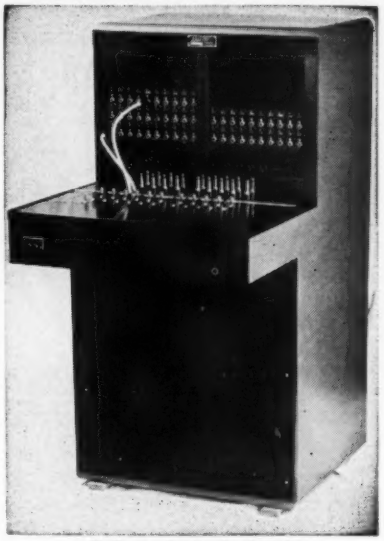

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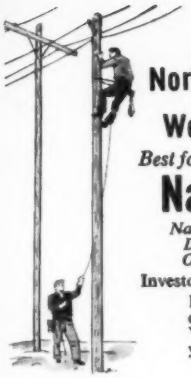

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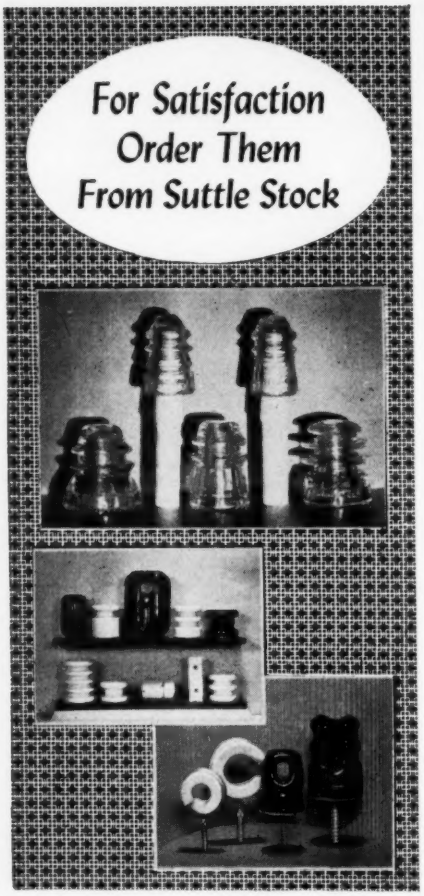

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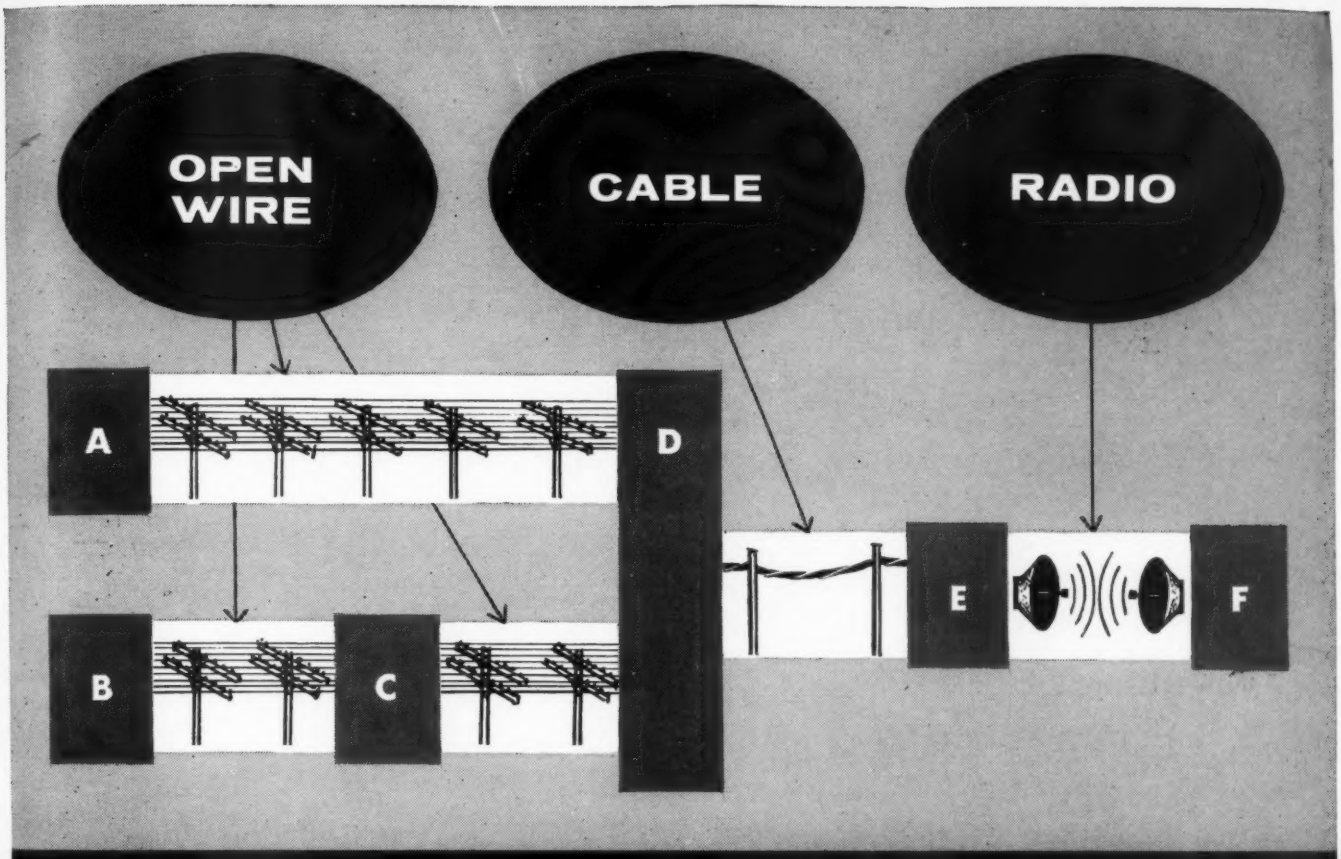

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